B·A
brower and associates

Roof Condition Report

9BSE-A - Administration Building

Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah

June 2001

Brower & Associates
Architects & Planners

1776 North State Street, - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
Fax: (801) 225-0138

Table of Contents

9BSD--2

INTRODUCTION

During the months of May and June, 2001, most of roofs of the Intermountain Power Project were evaluated by Brower & Associates, Architects and Roof Consultants, with regards to the condition of their roofs. Each roof was drawn, examined, photographed and analyzed.

The data taken from each roof was entered into MicroRoofer, a program produced and maintained by the University of Illinois at Urbana for the U.S. Army Corps of Engineers. The roof history of thousands of buildings, both military and civilian, are in the data base of the program. Each year, current data is added to the data base to keep the results of the evaluations up to date.

This report is the result of the inspection and the data gathered. Enough information is now available to make sound decisions about the repair and/or replacement of each roof.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

PHOTOGRAPHS

The first section of the report is a photographic record of the current conditions of the roof. Since the roofs are very similar, no attempt was made to provide an exhaustive photo history of each building.

The enclosed photographs are provided to give the reader a look at the general layouts of the roof, showing equipment, sizes and visual descriptions of defects. The full data on defects can be found in a following section.

SECTION INVENTORY REPORT

To evaluate the roof in comparison with the other roofs in the data base, the design and construction had to be identified. Most of the information was available through visual observations, but some information had to be assumed.

The exterior walls of the buildings are generally made of concrete tees on the lower floors and metal siding above. The structural frame is steel columns, beams and joists. The roofs are typically installed on steel joists and metal decking.

All of the roofs were originally built-up asphalt over board insulation, topped with pea gravel. Some roofs have subsequently been recovered with an EPDM single membrane or polyurethane foam (PUF).

Without the original roof specifications or a destructive roof cut, the actual insulation material cannot be determined. Therefore, the insulation was assumed to be expanded polystyrene board three inches thick and hot-mopped into place, a very common practice. When further information is available, the correct data can be entered into the data base and new reports generated. However, the conclusions and costs produced by the report should be unchanged even if a different material is found.

The data gathered is from visual inspection of the roof surface. No attempt was made to inspect the condition of the insulation. Before major repairs are started, a roof cut should be made to see the current condition of the insulation in the areas in question.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

ROOF INSPECTION WORKSHEET

Copies of the actual roof inspection drawings are included to show the size of each section of the roof and the location of equipment, access and defects. The drawing can be used to guide repairmen to the defects and compare the condition of the roof this year with subsequent years.

The defects typically include base flashings (BF), ponding (PD), roof drains (DR), surface deterioration (SP), metal caps (MC) and debris on the roof (DV). Each defect has a severity listed: low, medium or high. Defects are identified by comparing the actual on-site conditions with photographs of defects in the guidebook.

Thus, the information entered into the MicroRoofer program is consistent with all other information gathered for other projects. The results are, therefore, very subjective and do not vary from inspector to inspector.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

VISUAL INSPECTION SUMMARY

The visual inspection gives unique information about each roof section. The area, perimeter and curb measurements are listed.

The summary also gives the Roof Condition Index (RCI). The RCI is calculated by combining the Flashing Condition Index (FCI), the Membrane Condition Index (MCI) and the Insulation Condition Index (ICI). During our inspection of the roofs, we found nearly all defects were with the base flashings and little, if any, visual defects in the membrane, such as blisters, splits, slipped asphalt plies or wind scour. The MCI, subsequently, is usually 100, meaning the membrane shows no defects. As mentioned earlier, the insulation was not evaluated and also shows an ICI of 100.

The RCI is a numeric score from one to one hundred, with anything under 60 requiring immediate evaluation and attention. The program estimates the cost of maintaining the roof each year for ten years and then makes an evaluation whether the roof should be maintained or replaced. An estimate is also made to the year when the roof should be replaced, based on the history of other similar roofs. The program only includes estimates for the coming ten years.

A list of the defects is included, with the severity and quantity. The FCI has the most typical defects. The membrane has few defects so the MCI is usually 100. Since the insulation was not examined, the ICI is always 100.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

Maintenance, Repair & Replacement Analysis

With the roof drawings and the defect list, a workman can easily find the defect and correct it. The Owner also has a guide to the normal cost of the repairs.

The MR&R gives more information about the roof section, such as area and current age.

The program predicts a year for probable replacement without any repairs and another date if the suggested repairs are made.

The cost of repairs is estimated, along with the cost for replacement. The cost of repairs is compared to the cost of replacement and a recommendation is given: repair, marginal or replace. The user must consider that the recommendation is only for the particular section of the roof being reported. The overall condition of the entire roof should be evaluated before making a final decision.

The second page justifies the recommendation made. It also included design considerations that should be considered when the work is designed.

The last sheet lists the recommended corrective action for maintenance or repairs.

With the enclosed information, the Owner can sit down with the roof consultant to create a plan for roof repairs and replacements for the next ten years. An inspection schedule can be made and a structured plan formalized to assure that the roofs receive proper attention.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

Summaries

The information from each individual roof is valuable to evaluate the work to be done on each section. Planners, however, need to see an overall picture of the project to make cost projections for future budgets.

The information for each section and visual reports are provided separately. MicroRoofer makes a summary of the entire project, which is furnished in this book.

The Section Inventory Report to the entire project is included. Individual reports are contained in the report for each building.

The Maintenance, Repairs and Replacement Summary (MR&R) lists the data for the entire project. The Roof Condition Index (RCI) for each section is listed in ascending order, to show which sections should be prioritized. The report also shows the change in the RCI if the suggested repairs are made, plus an estimate of the increased life of the roof. Then a recommendation is made, whether to repair or replace the roof and the estimated remaining life of the roof section.

Next is the Inspection Schedule Report, which lists the sections that should be examined each year. The sections with the most problems and lower RCI are listed for examination more frequently, while the entire project should be reviewed every five years.

The Distress Analysis contains all of the work listed in each individual report. The cost for each type of work is listed.

Finally, a proposed 10-year program is included, to help the Owner plan for the costs of the necessary work to keep the roofs intact and the building contents protects. This budget is a starting point for the discussion between the roof consultant and the Owner to determine the exact program to meet the Owner's budget and building needs.

Section Inventory Report

The Section Inventory Report is provided so the Owner can see the information on the entire project without going through each individual report. The same information is included in the reports for the individual buildings.

The report lists the construction characteristics of each building.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

MR&R Analysis Summary

The Maintenance, Repair and Replacement Analysis Summary for the entire project is included to provide a convenient comparison between the sections. The sections are listed in ascending order of the RCI, with the lowest numbers listed first.

The report summarizes the cost of repairs, cost of replacements, the year of replacement and the change in the RCI if the repairs are made. It also gives a recommendation if the roof is marginal, should be repaired or replace.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

Inspection Schedule Report

The Owner has a great deal of capital tied up in his buildings and their proper function. To keep the roofs in proper condition and to extend their life, the roof sections must be examined on a regular schedule by someone who is trained to identify potential problems.

MicroRoofer suggests a yearly inspection schedule, based on the Roof Condition Index (RCI) of each section. Just as a sick child requires more attention, an aging roof needs more care to allow it to give its maximum service.

A schedule of inspections is included to help the Owner make an operational plan to see each roof section when it is most advantageous. An automobile needs some maintenance every 3,000 miles and other work on 15,000 mile intervals. More expensive maintenance is scheduled at 30,000 and 60,000 miles. Similarly, the roof sections with the lowest scores should be visited more frequently. Every section should be inspected every five years and the reports redone.

The proposed inspection fees are based on a square foot cost of $0.025 per square foot. The cost of this inspection was based on $.04 per square foot.

The Owner can have an employee trained to make these inspections and maintain the data base. Or an outside consultant can be retained to make the yearly roof inspections and provide current reports.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

Distress Analysis

This report provides the Owner a summary of the cost of each defect or distress. The report allows the Owner to determine the cost of repairing each class of defect, such as base flashing.

If the base flashing of all of the buildings were repaired, the repairs would easily outlive the roof membrane over the rest of the roof.

The most critical defects to repair are the roof drains. From the report, $9,584 would be required to make all of the repairs.

Using this report, the Owner can direct his repair budget to the areas that most need the work.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

10-YEAR PROGRAM

The Ten-Year Budget Report can be invaluable to budget planners as they try to allocate funds for roof maintenance, repairs and replacement. Most Owners spend money on their roofs only when an emergency presents itself, instead of making an intelligent yearly program of roof work.

Just as an automobile requires periodic maintenance to give maximum life and service, a roof needs yearly attention to prevent small defects from becoming roofing and budget disastsers.

The 10-year program gives a budget outline for all of the work that is anticipated during the next ten years. If the work is not critical, it is spread over several years, as major repair projects. Replacements are also shown, along with the cost of insulation inspection and visual inspection.

For this project, a total of $909,000 is estimated to maintain, repair and/or replace the roofs. The Owner should note, however, that the bulk of the roofs are listed for replacement within the next twelve years so the roof budget will grow substantially after ten years.

Brower & Associates
Architects & Planners

1776 North State Street - Suite 300
Orem, Utah 84057-2025

(801) 225-8859
fax (801) 225-0138

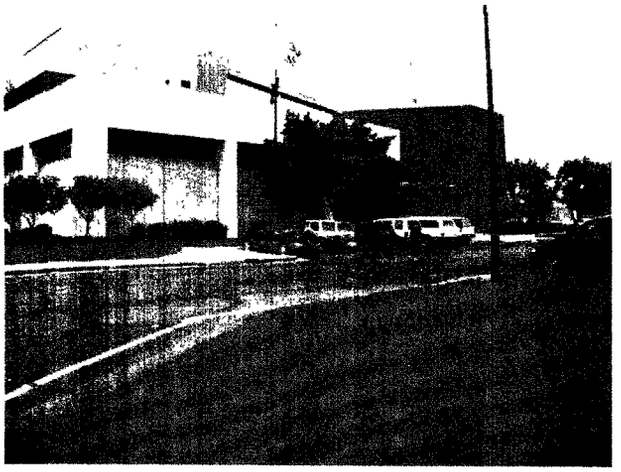


Photo No. 1-A

The east side of the Administration Building, looking northwest. Unit One Boiler is in the background.

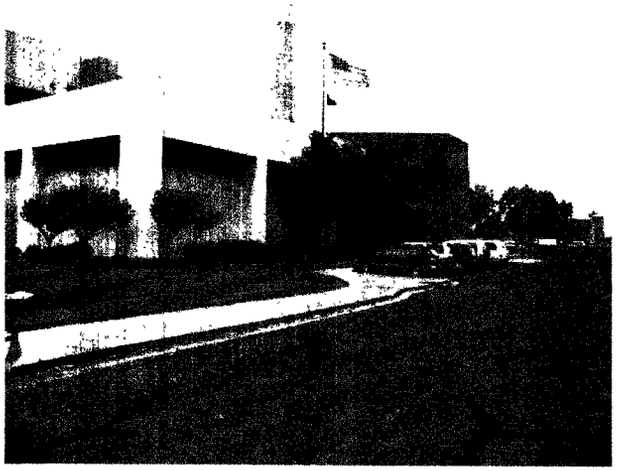


Photo No. 2-A

The southeast corner of the Administration Building.

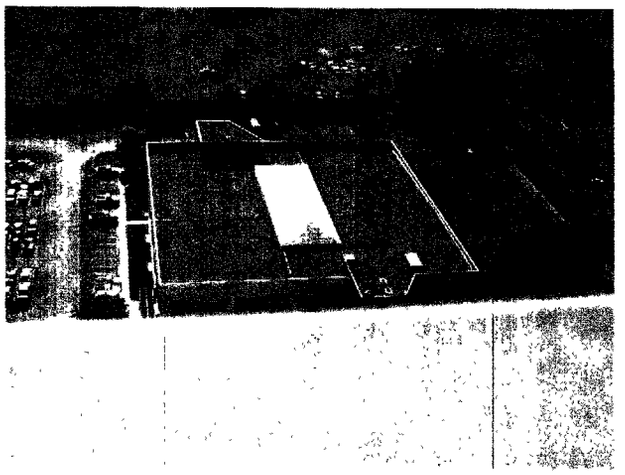


Photo No. 3-A

The roof of the Administration Building, looking east from the roof of Unit One Boiler.

Photo No. 1

Roof of the Administration Building, as seen from the General Services Building, looking east.

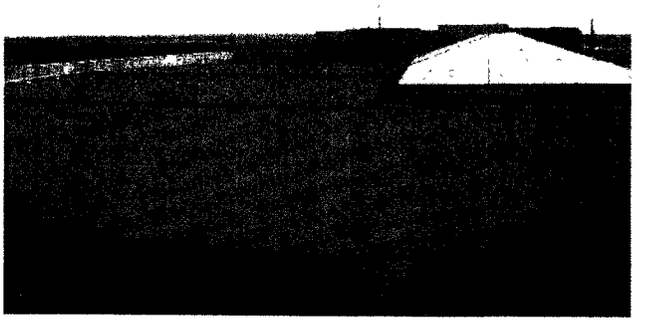


Photo No. 2

Southwest corner of the Administration Building, looking southeast.

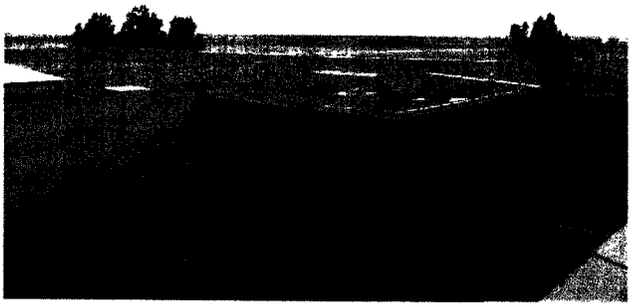
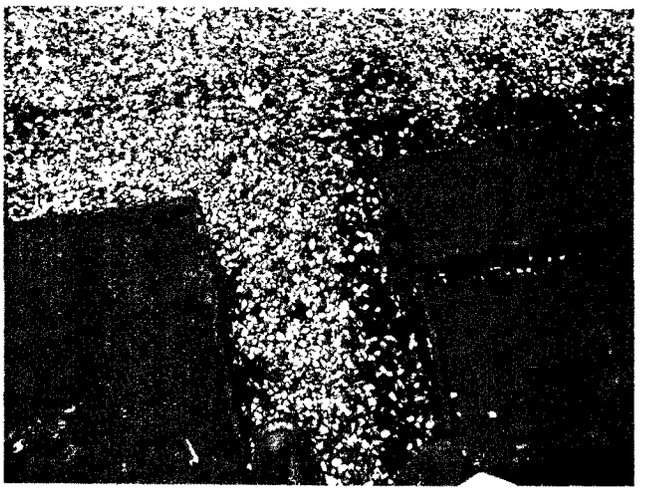


Photo No. 3

Roof walkway pads are almost completely destroyed by the sun.



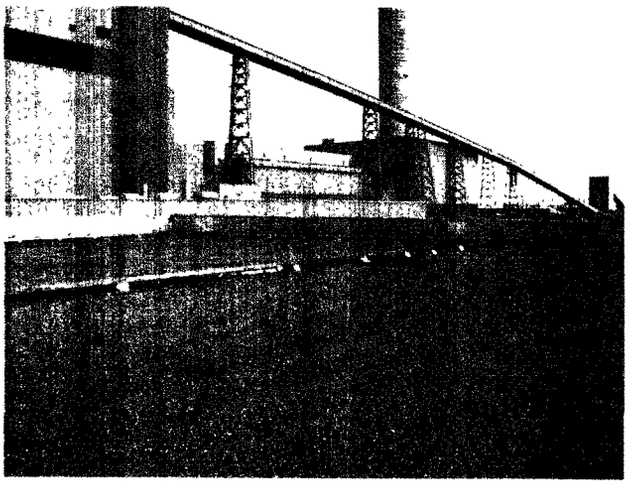


Photo No. 4

The center of the north half of the roof, looking northwest. Note the expansion joint through the center of the photo.

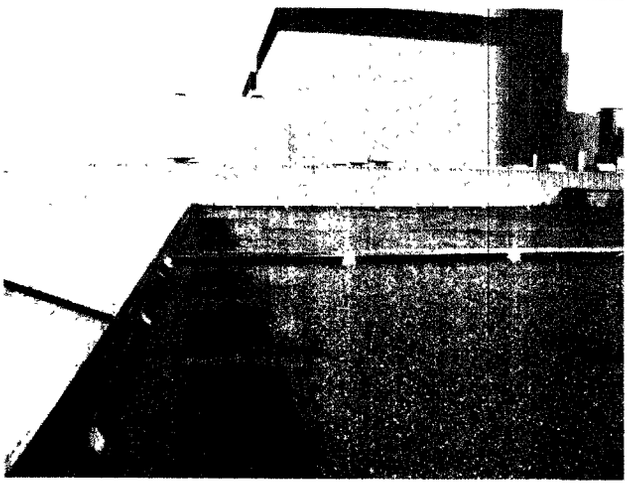


Photo No. 5

The north side of the main skylight, looking west at Unit One.

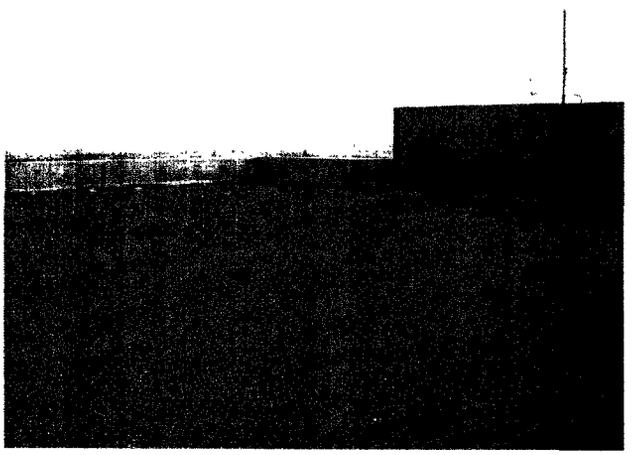


Photo No. 6

The northeast corner of the roof, looking northeast at the stair tower.

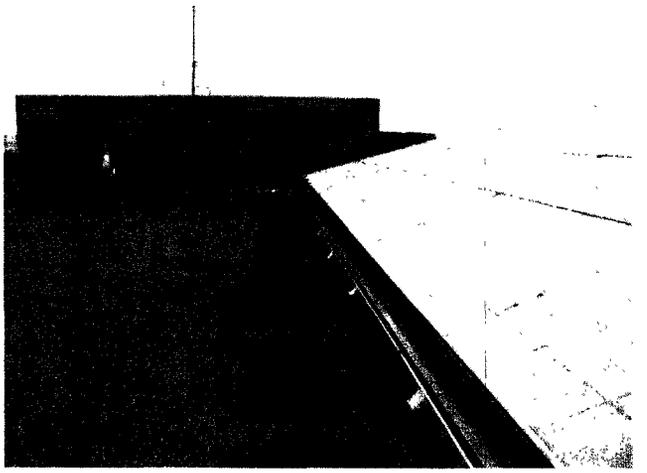


Photo No. 7

The north side of the skylight, looking east at the stair tower.

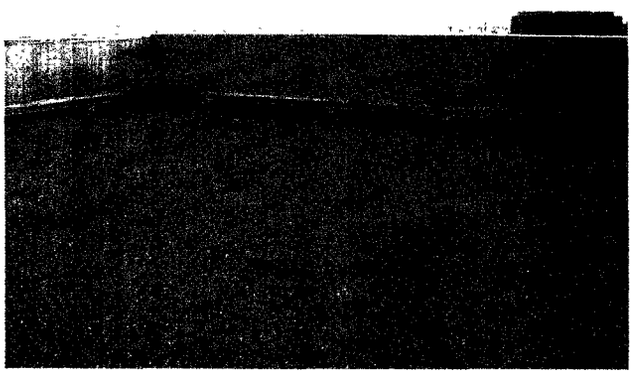


Photo No. 8

The northeast corner of the building, looking northeast.

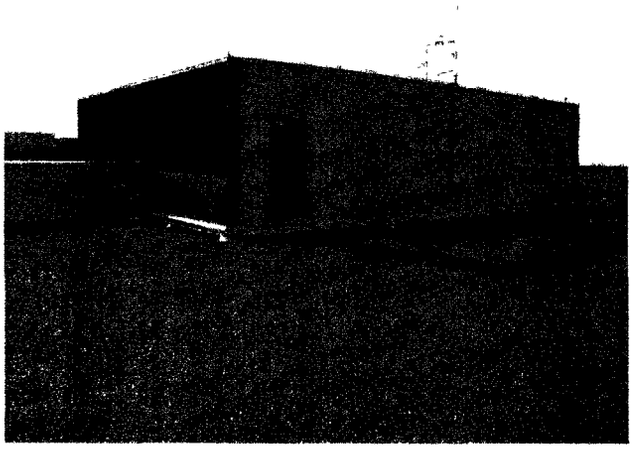


Photo No. 9

The stair tower on the east side of the building, looking southeast.

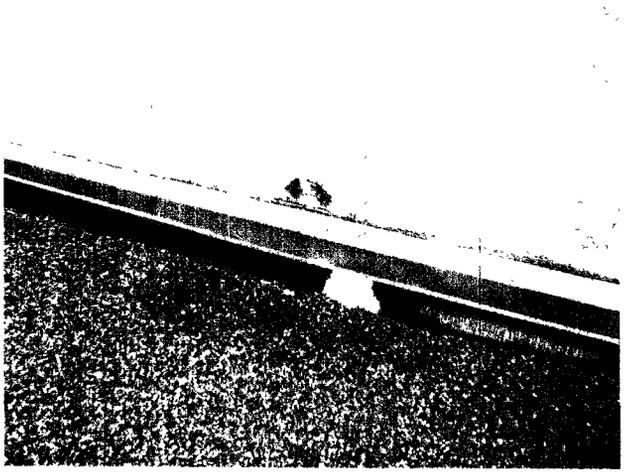


Photo No. 10

North parapet wall. Note the hole in the wall and the gap at the top of the counterflashing. The base flashing has been painted at all joints around the roof.

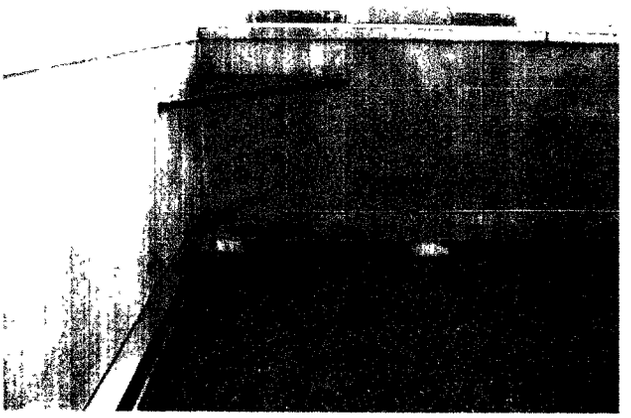


Photo No. 11

Northeast corner of the roof, looking east. Note the brace in the corner and the two holes below. The parapet is bare concrete.

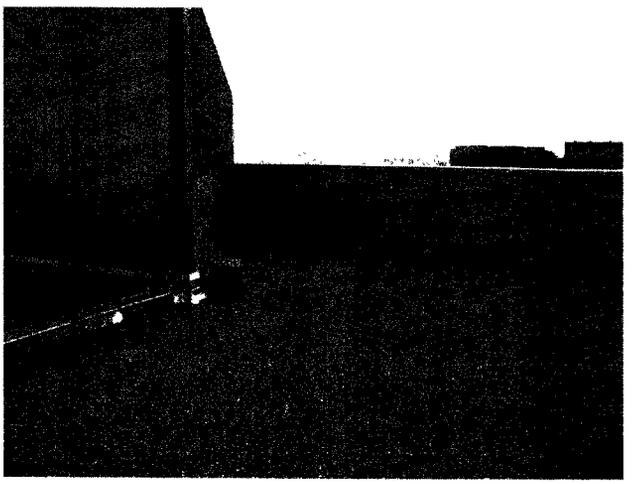


Photo No. 12

East parapet wall, looking east. The stair tower is to the left of the photo. Note the concrete blocks next to the stair tower.

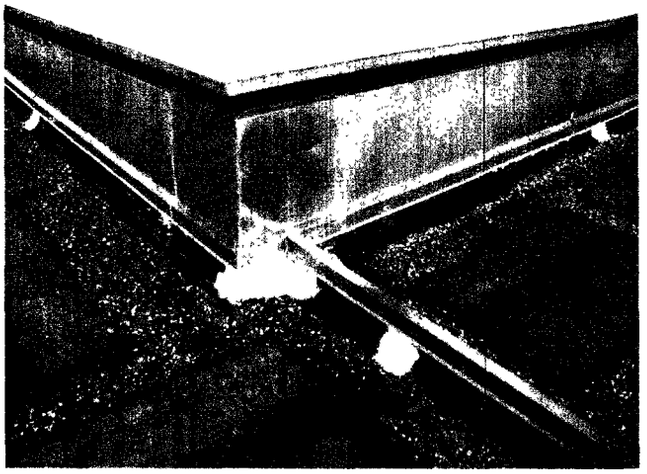


Photo No. 13

The southeast corner of the skylight.

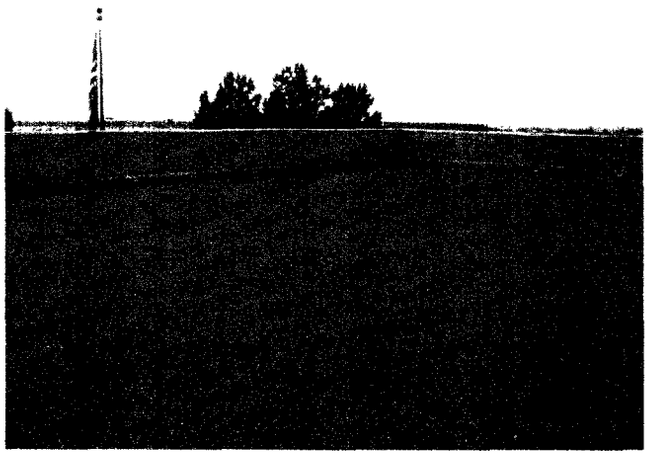


Photo No. 14

The southeast corner of the roof, looking to the southeast. No crickets are present to direct the water to the roof drains.

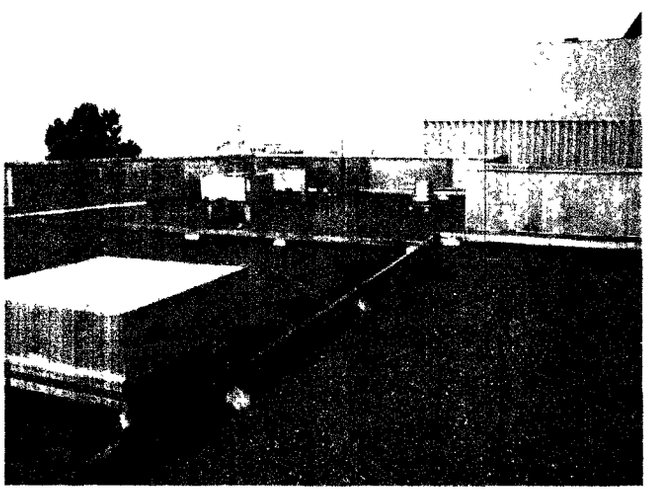


Photo No. 15

The west area of the roof, looking west.

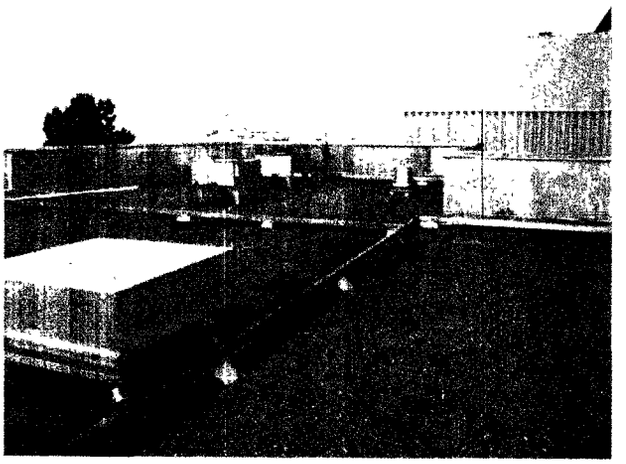


Photo No. 16

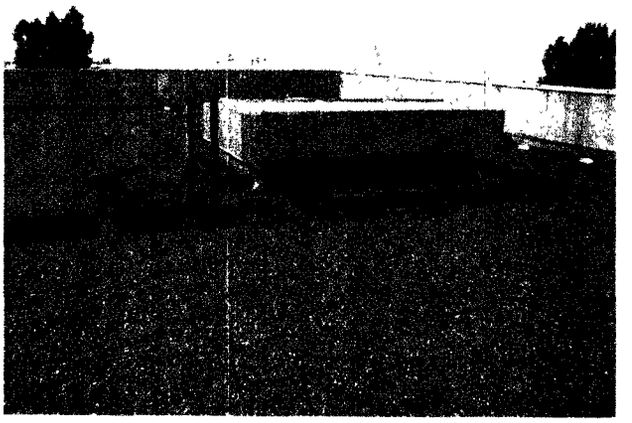


Photo No. 17

Equipment near the west wall of the building, looking south.

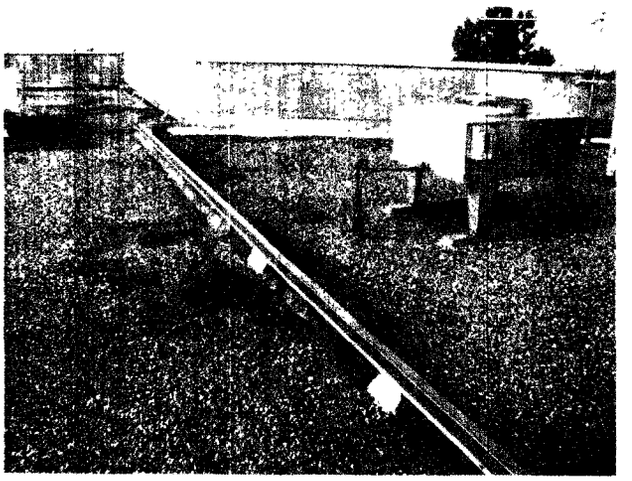


Photo No. 18

The west end of the roof, looking south. Note the blue berries near the expansion joint.

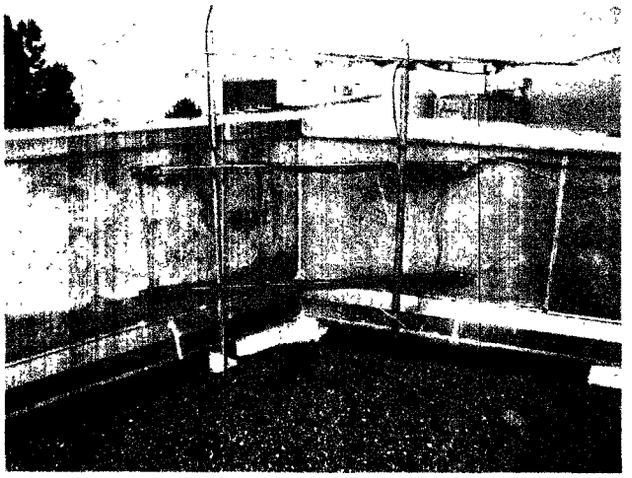


Photo No. 19

Television antennae on the west parapet wall, looking southwest.

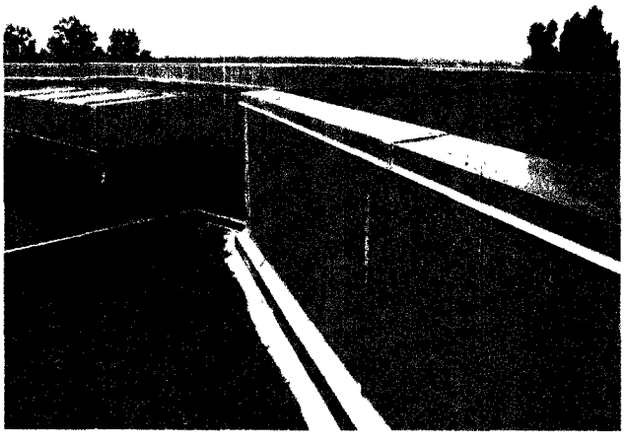


Photo No. 20

Southwest corner of the roof, looking to the southeast. The equipment is shown also in Photo No. 17.

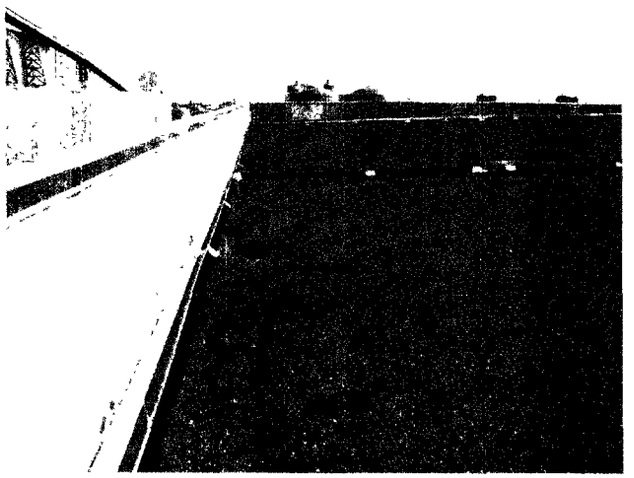
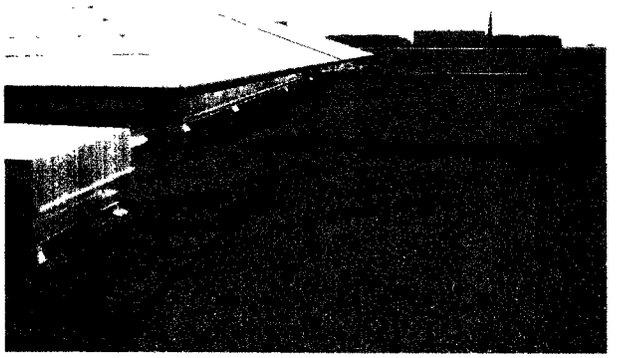


Photo No. 21

West parapet of the building, looking north. Note the blueberries in the lower center of the photo. No crickets have been installed to direct the water to the drains.

Photo No. 22

South side of the skylight, looking east.



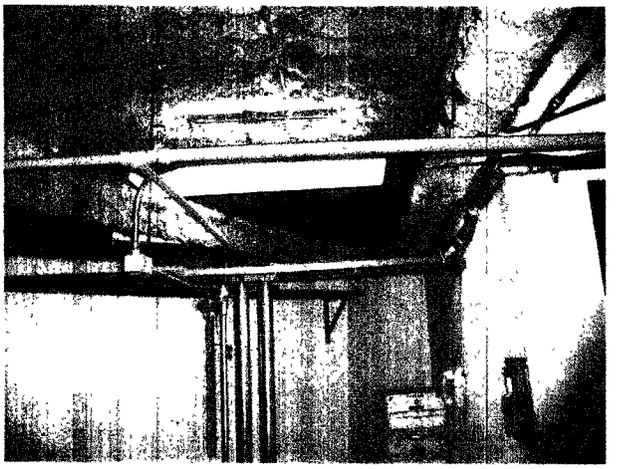


Photo No. 23

Inside the stair tower. The roof structure has been covered with fire-retardant covering.

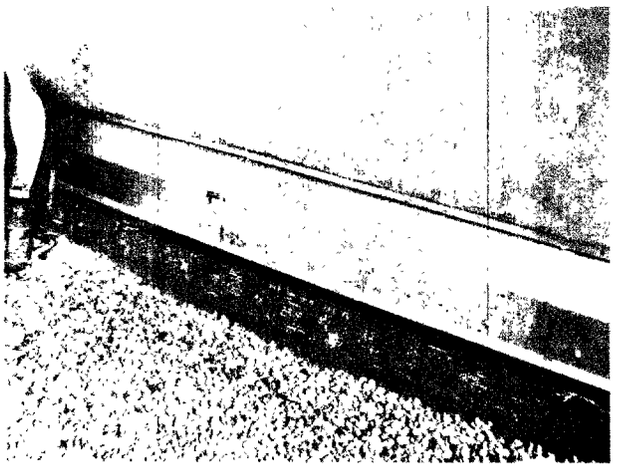


Photo No. 24

Counterflashing along the west wall of the stair tower. Note the gap at the top of the metal.

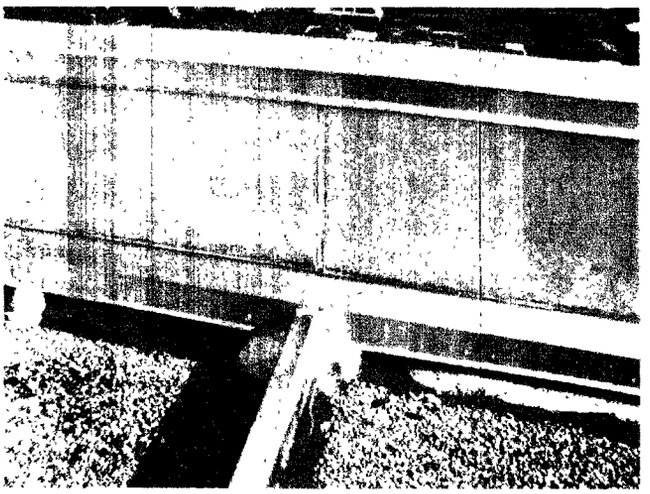


Photo No. 25

The joint of the expansion joint and the north parapet wall. The joint in the wall is separating.

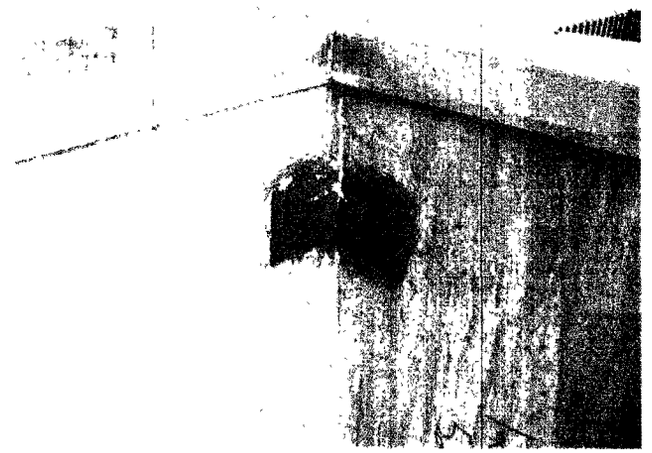


Photo No. 26

The northwest corner of the roof, showing the steel brackets holding the panels together.

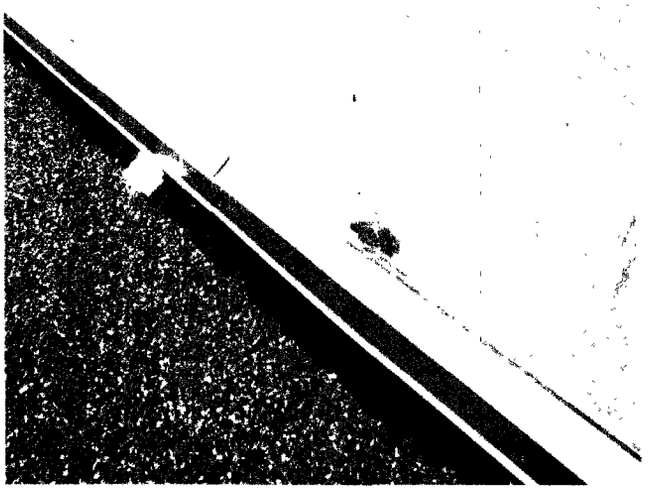


Photo No. 27

Gap in the counterflashing and a hole above the metal.

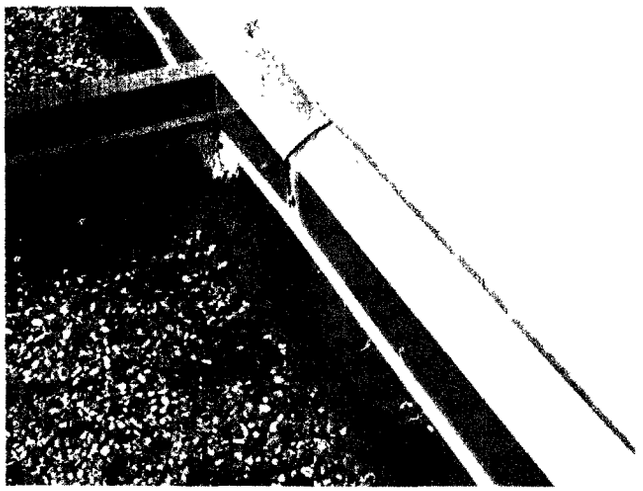


Photo No. 28

A gap in the counterflashing.

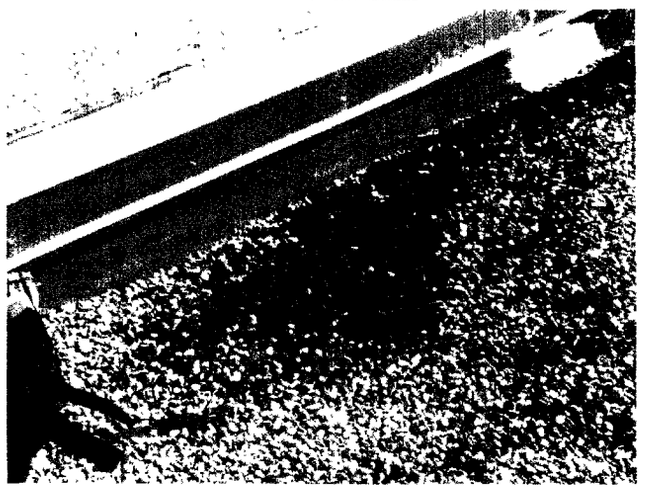


Photo No. 29

Extensive blueberries adjacent to the parapet wall.

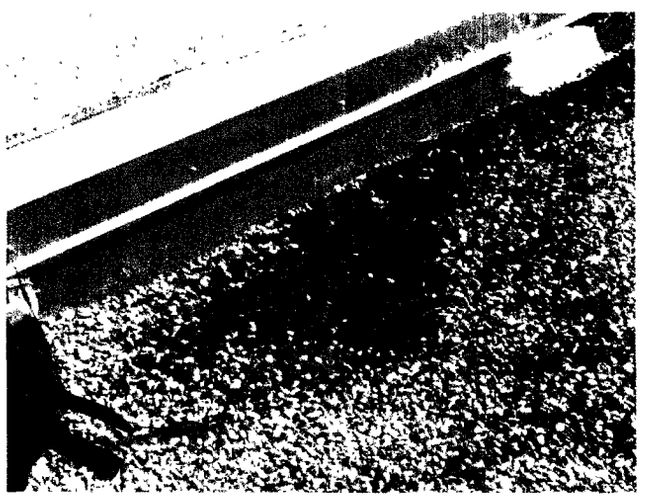


Photo No. 30

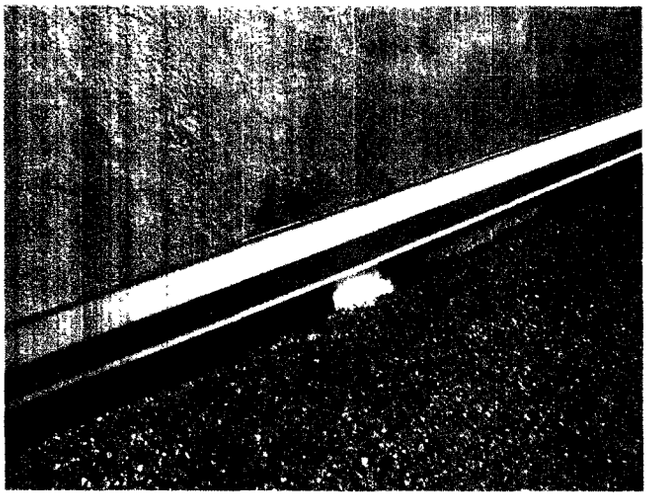


Photo No. 31

Holes in the wall above the metal counter-flashing.

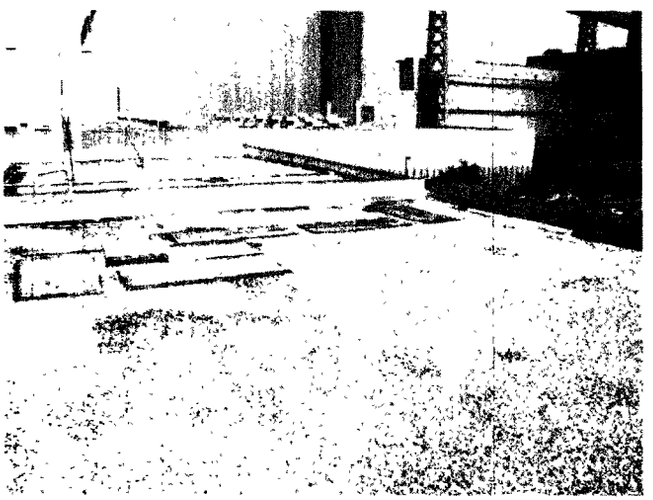


Photo No. 32

The roof of the stair tower, looking west.

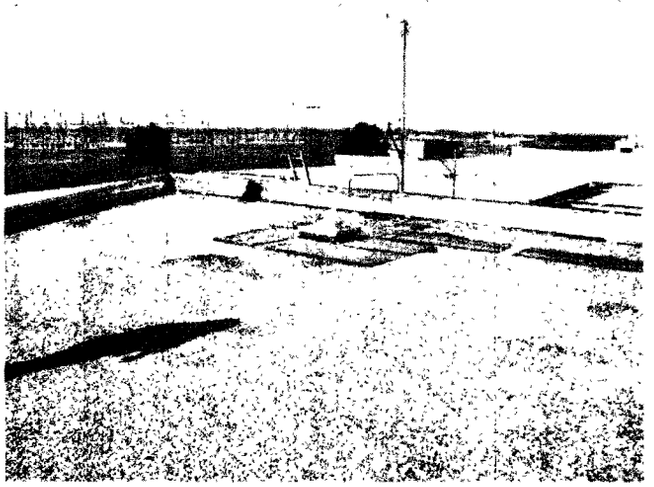


Photo No. 33

The roof of the stair tower, looking to the northeast.

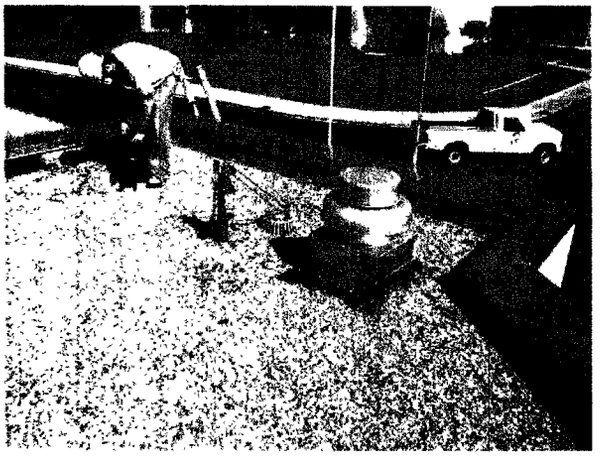


Photo No. 34

The roof of the guard building at the main entrance, looking northwest. Note the pipe inserted into the toilet stack.

Photo No. 35

A gap in the base flashing in the expansion joint.

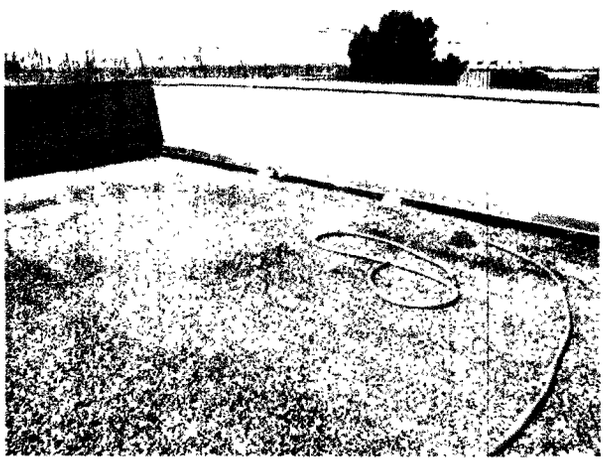
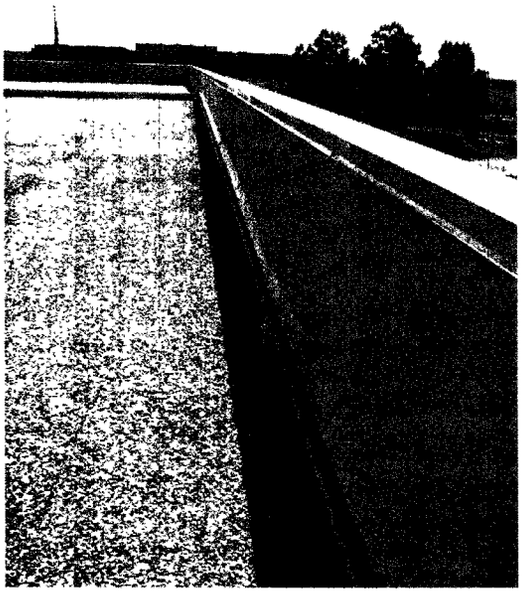


Photo No. 36

The southwest corner of the building, looking southwest. The hose is probably condensate drainage.

Photo No. 37

The south wall of the building, with gaps in the cap metal.



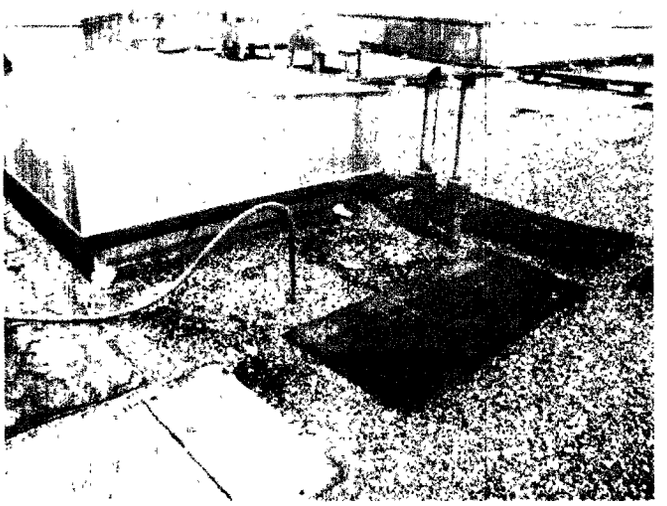


Photo No. 38

Equipment near the west wall of the building, looking west.

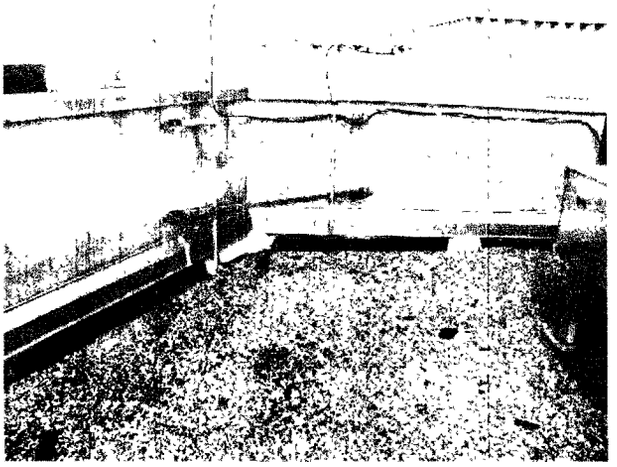


Photo No. 39

West area of the roof. See Photo No. 19.

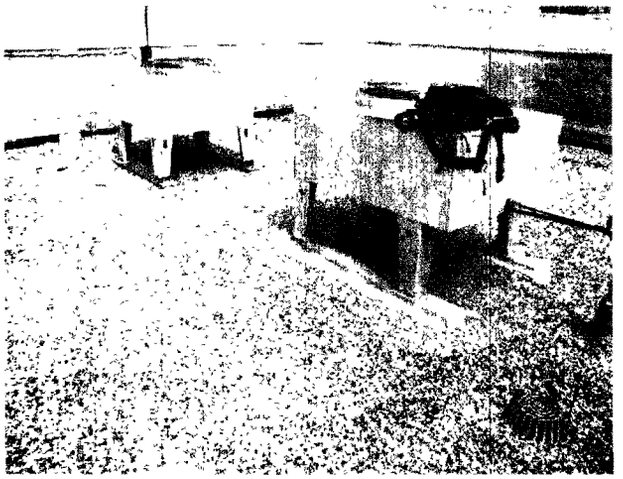


Photo No. 40

Equipment near the west wall. The supports under the equipment are very low.

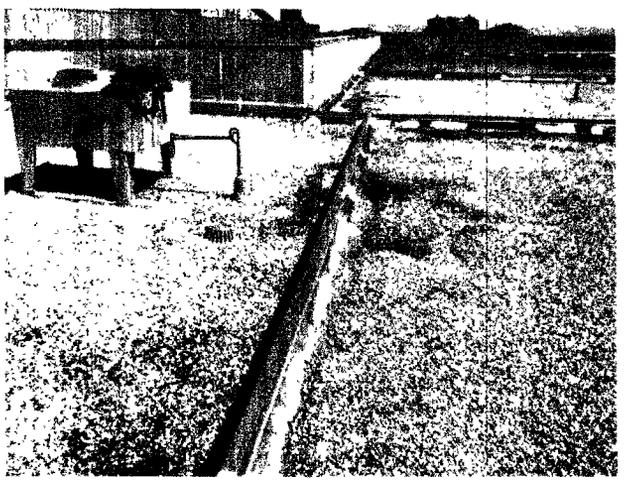


Photo No. 41

West area of roof, looking east. Note the blueberries on either side of the expansion joint.

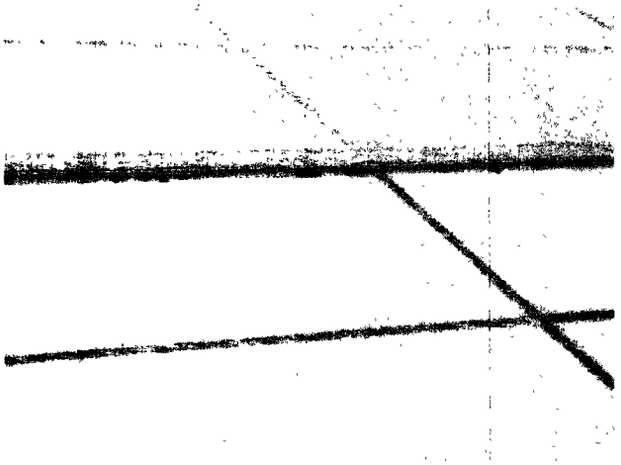
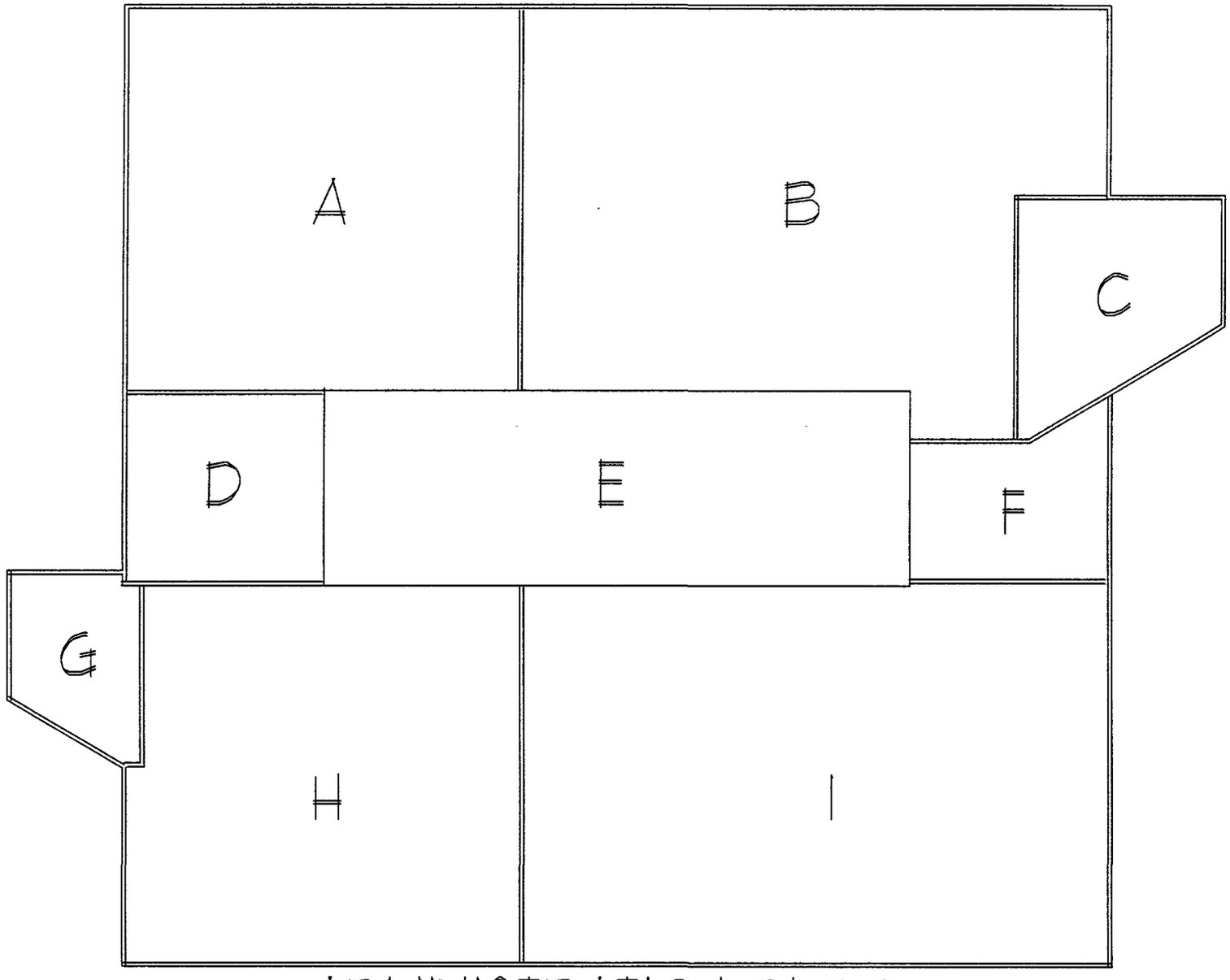


Photo No. 42

The skylight, showing the joint. The dark spots appear to be a growth.



ADMINISTRATION BLDG.

IP12_003977

Date: JUN/13/2001	Section Inventory Report	Page 1

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAA Area: 5929 Sq.Ft.
Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: 154 Ft. Exp. Joint: 154 Ft. Adj. Wall: Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAB Area: 8235 Sq.Ft.
Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: 218 Ft. Exp. Joint: 95 Ft. Adj. Wall: 90 Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Date: JUN/13/2001	Section Inventory Report	Page 3

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAC Area: 1270 Sq.Ft.

Last Replacement: Original Construction: 1985
Occupancy: Offices

Perimeter
Parapet: 150 Ft. Exp. Joint: Ft. Adj. Wall: Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: EXTERNAL LADDER: Temporary Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Date: JUN/13/2001	Section Inventory Report	Page 4

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAD Area: 1476 Sq.Ft.

Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter

Parapet:	36	Ft.	Exp. Joint:	82	Ft.	Adj. Wall:	36 Ft.
Roof Edge:		Ft.	Area Div.:		Ft.	Other:	Ft.

Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: VINYL

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAE Area: 3888 Sq.Ft.
Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: Ft. Exp. Joint: Ft. Adj. Wall: Ft.
Roof Edge: 288 Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: NONE

Insulation: NONE
Thickness: In. Layers: Tapered: N
R-Value:
Attachment:

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type:
Attachment:
Reinforcement:
Surfacing:
Walkways:

Base Flashing:
Flashing Adhesive:
Counterflashing:
Types:

Remarks: Skylight

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAF Area: 1220 Sq.Ft.
Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: 54 Ft. Exp. Joint: 61 Ft. Adj. Wall: 20 Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Date: JUN/13/2001	Section Inventory Report	Page 7

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAG Area: 429 Sq.Ft.

Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: 75 Ft. Exp. Joint: 32 Ft. Adj. Wall: Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAH Area: 5929 Sq.Ft.

Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: 115 Ft. Exp. Joint: 72 Ft. Adj. Wall: 36 Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment:

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Installation: IPP - Intermountain Power Project

Building No.: 9BSE-A Section: 9BSEAI Area: 8547 Sq.Ft.
Last Replacement: Original Construction: 1985
Occupancy: Office

Perimeter
Parapet: 188 Ft. Exp. Joint: 77 Ft. Adj. Wall: 72 Ft.
Roof Edge: Ft. Area Div.: Ft. Other: Ft.
Access: PENTHOUSE Adj Roof Sec:

Structural Frame: STEEL: Bar Joists/Beams & Columns

Roof Deck: STEEL
Slope: 1/4
Drainage: INTERIOR DRAINS

Vapor Retarder: UNKNOWN

Insulation: EXPANDED POLYSTYRENE
Thickness: 4 In. Layers: 2 Tapered: N
R-Value: 19
Attachment: ADHESIVE - HOT

Membrane: Mfg: Spec. No.:
Description:
Protected Mem.: N
Type: BUR: Asphalt
Attachment: FULLY ADHERED
Reinforcement: B.U.(HOT/COLD): Glass Felt
Surfacing: AGG: Pea Gravel
Walkways: ASPHALT PLANK

Base Flashing: REINFORCED ASBESTOS
Flashing Adhesive: HOT MOPPED
Counterflashing: METAL
Types: WALL/PARAPET

Remarks:

Installation: IPP - Intermountain Power Project

Selection Criteria

Building ID	9BSE-A
Category Code	All
Membrane Type	All
Insulation Type	All
Deck Type	All
Roof Slope	All
Section Area	All

Sort Criteria

Building ID - Ascending

IPP

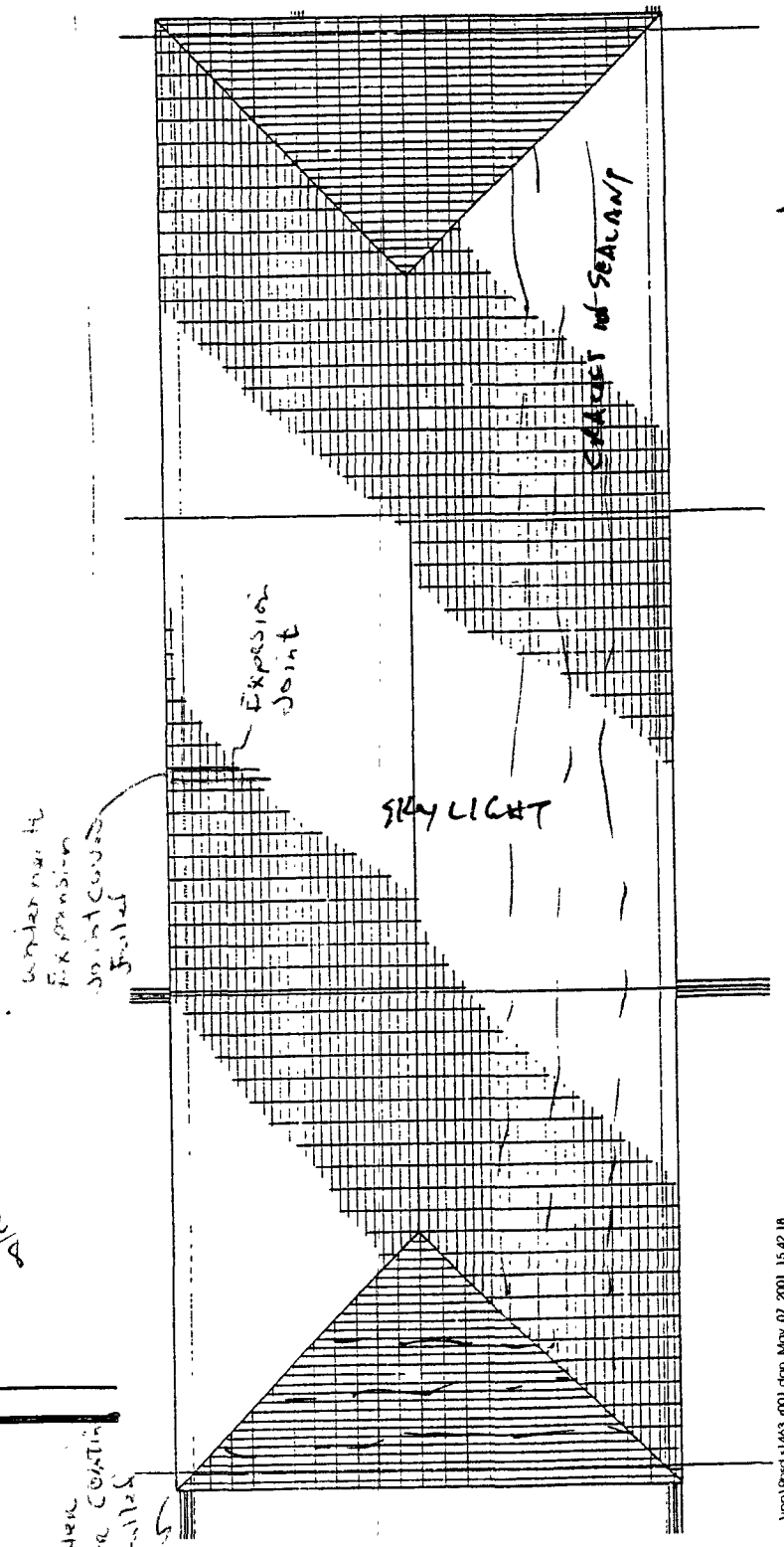
ROOF INSPECTION WORKSHEET | AGENCY/INST.:

BUILDING Administration | PER. FLASHING [illegible] LF | DATE

SECTION F | CURB FLASHING 288 LF | NAME

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING

ID #	DIS	SEV	DEF	QTY
BF	2	L		288
BF	2	L		288
BF	3	L		288
BF	2	M		288



216
72
288

SCALE: _____

NORTH

\\pp19sd s1463_r001.dgn May 07, 2001 15:42:18

IP12_003988

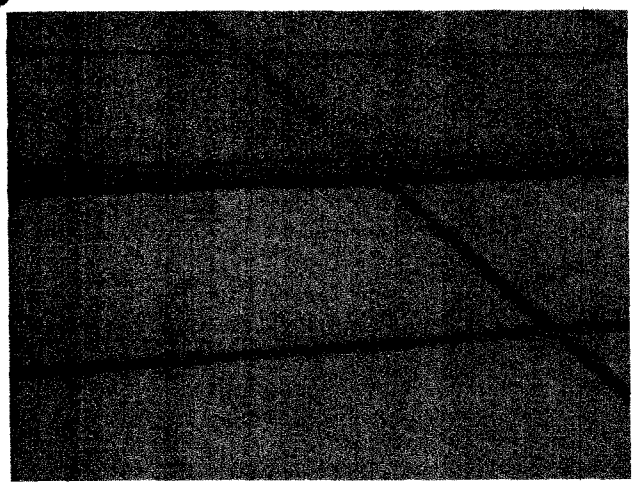
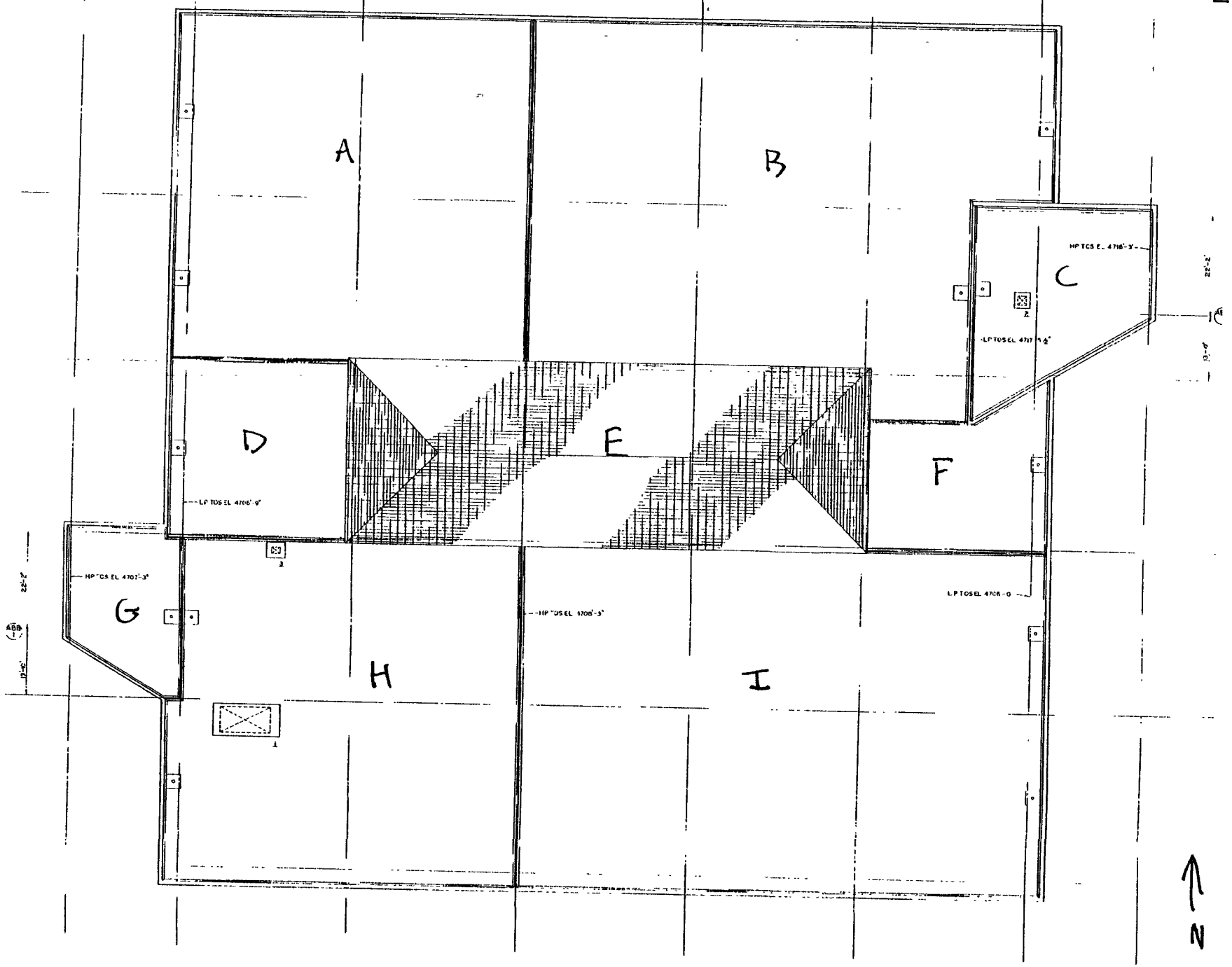


Photo No. 42

The skylight, showing the joint. The dark spots appear to be a growth.

Administration Bldg. (#3)

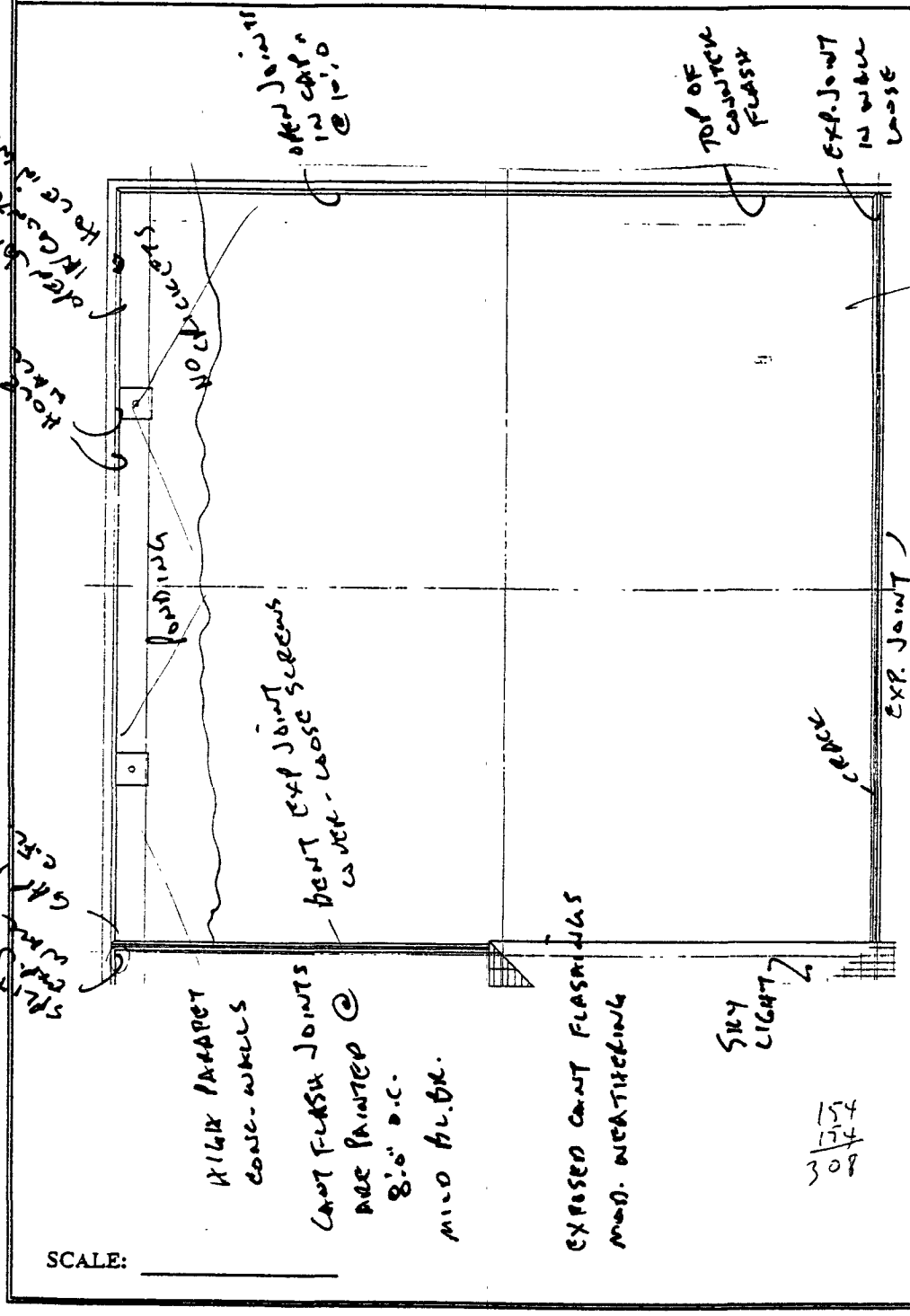


IP12_003990

IDP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:
BUILDING Administration PER. FLASHING 1,308 LF	DATE
SECTION A CURB FLASHING 154 LF	NAME

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING



ID #	DIS	SEV	DEF	QTY
BF	2	L		308
BF	13	H		2
BF	14	H		2
PD	6	L		308
RD	2	m		2
BF	2	L		308
BF	3	L		308
BF	2	m		308
BF	1	H		4
PD	1	L		308
RD	1	m		2

154
154
308

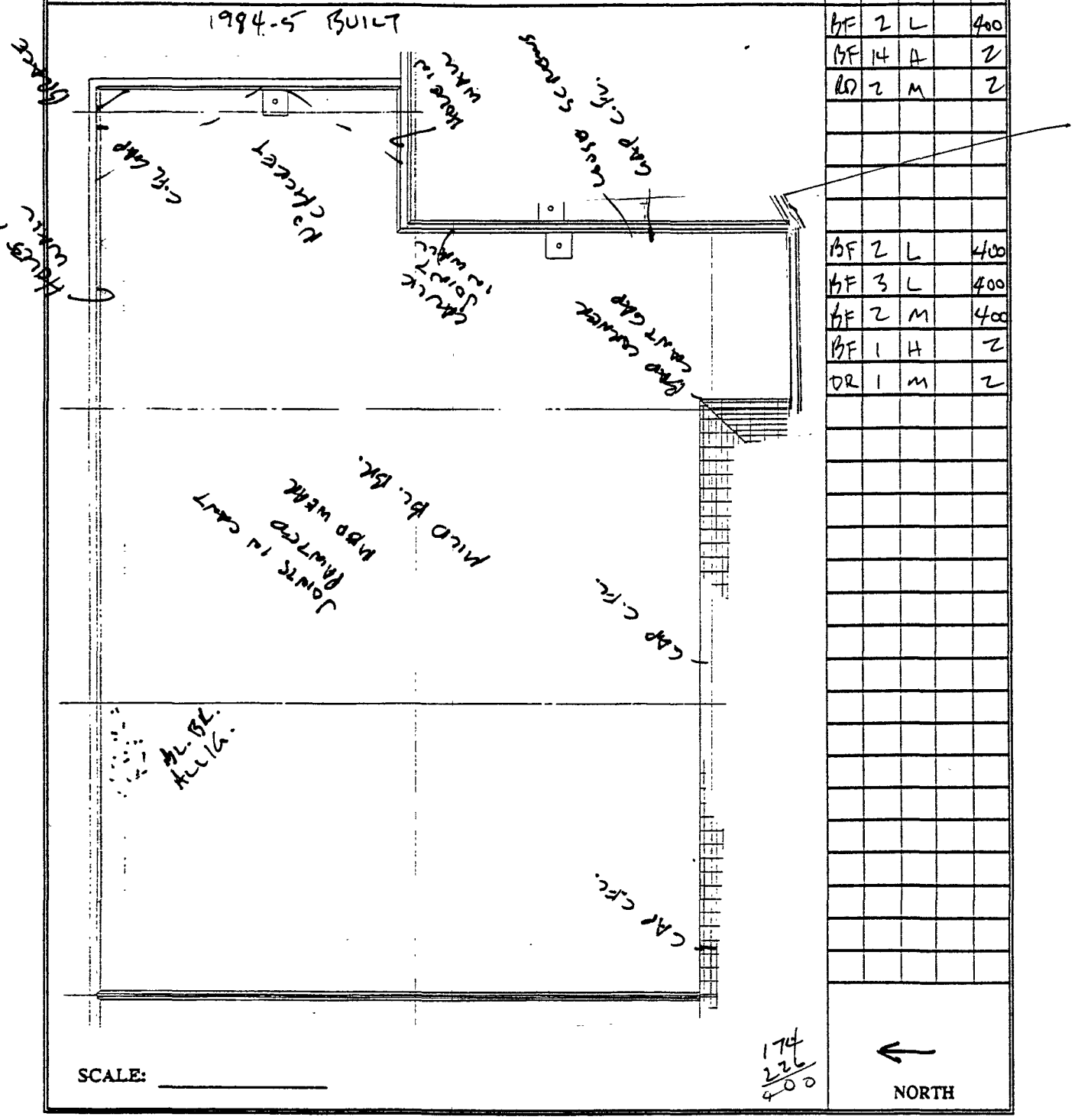
NORTH

IP12_003991

IPP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:	
BUILDING Administration	PER. FLASHING 400 LF	DATE 5/17/2001
SECTION B	CURB FLASHING ____ LF	NAME G. Brower

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING



ID #	DIS	SEV	DEF	QTY
BF	2	L		400
BF	14	A		2
RD	2	M		2
BF	2	L		400
BF	3	L		400
BF	2	M		400
BF	1	H		2
DR	1	M		2

174
226
400

SCALE: _____

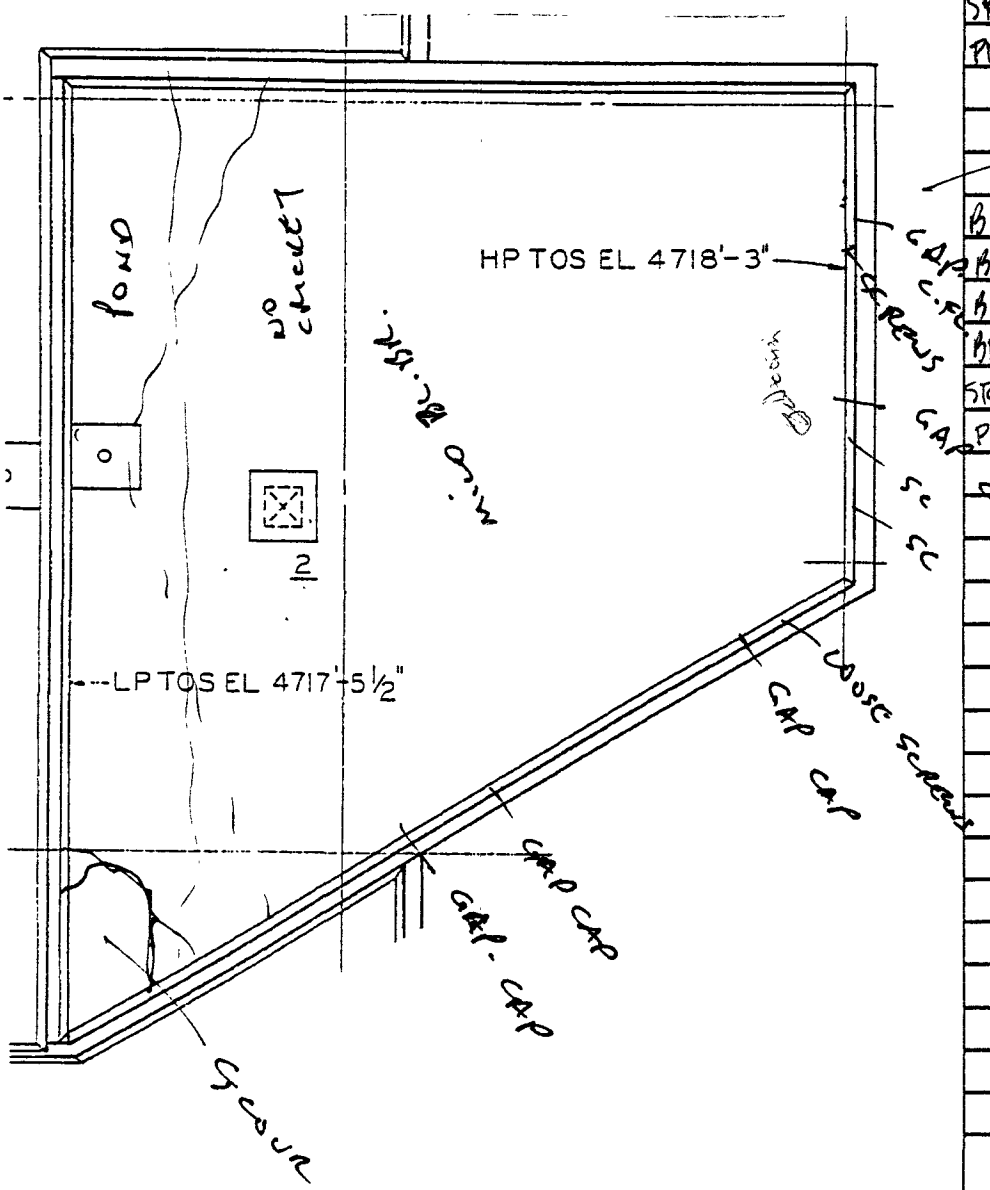
NORTH

IPP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:	
BUILDING Administration PER. FLASHING 150 LF		DATE
SECTION C CURB FLASHING 16 LF		NAME

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING

ID #	DIS	SEV	DEF	QTY.
BF	2	L		150
BF	2	L		16
BF	13	H		2
SR	9	M		16
PD	6	L		170
BF	2	L		166
BF	3	L		166
BF	2	M		166
BF	1	H		2
SR	1	M		16
PD	1	L		170



SCALE: _____

NORTH

IP12_003993

TPP

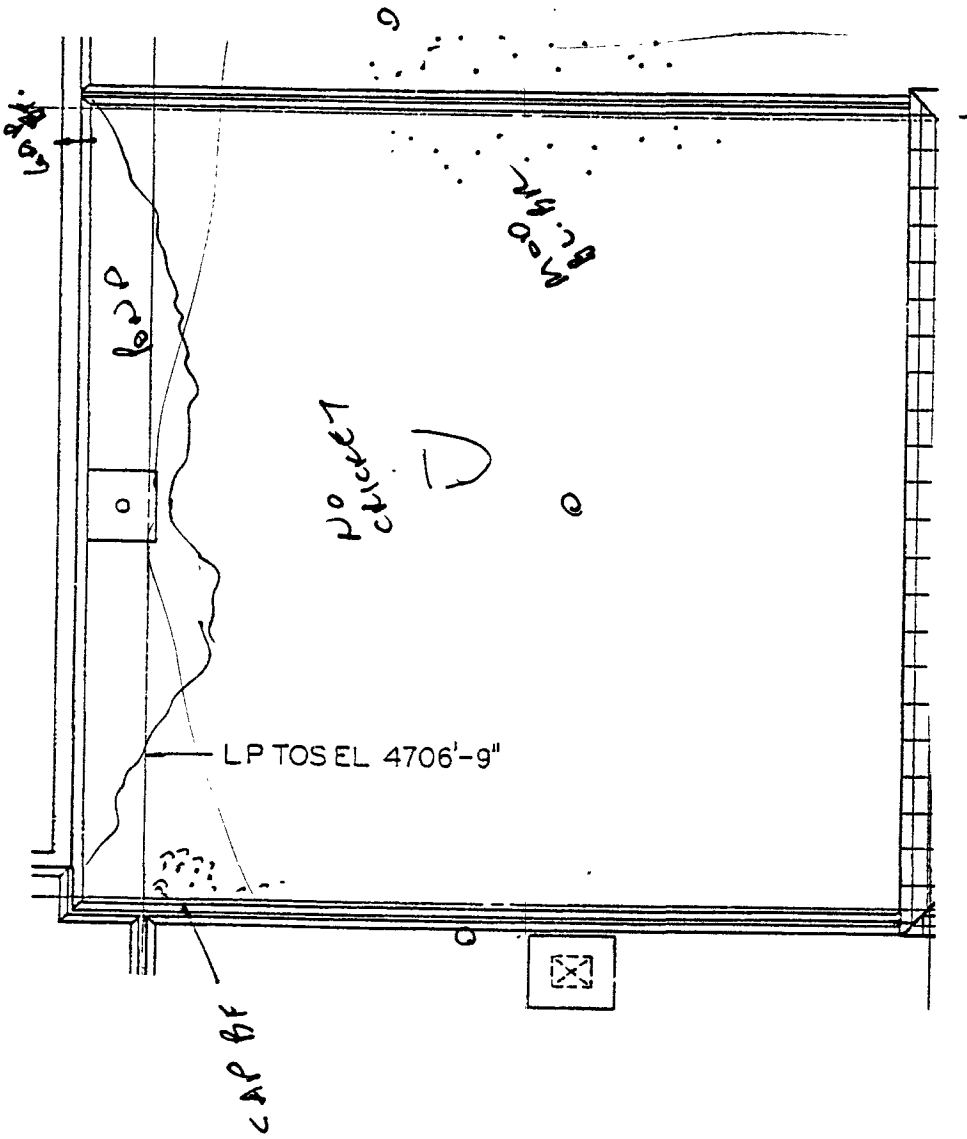
ROOF INSPECTION WORKSHEET	AGENCY/INST.:

BUILDING Administration PER. FLASHING 154 LF DATE _____

SECTION D CURB FLASHING _____ LF NAME _____

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING

ID #	DIS	SEV	DEF	QTY
BF	2	L		154
PD	6	L		144
RG	2	M		1
BF	2	L		154
BF	3	L		154
BF	2	M		154
PD	1	L		144
DR	1	M		1



SCALE: _____

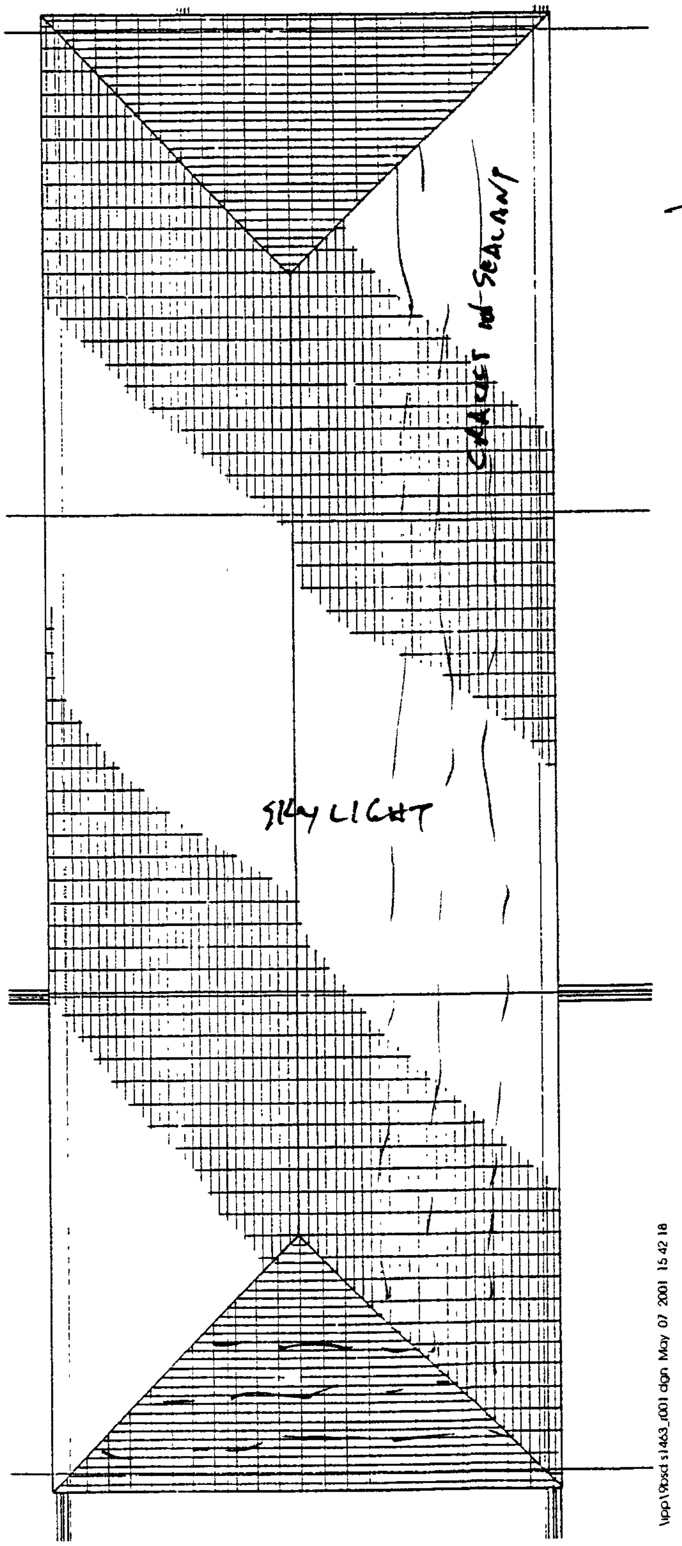
NORTH

IP12_003994

IPP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:		
BUILDING Administration	PER. FLASHING [illegible] LF	DATE	
SECTION F	CURB FLASHING 288 LF	NAME	

BF-BASE FLASH
MC-METAL CAP
EM-EMBEDD MET
FP-FLASHED PEN
PP-PITCH PANS
DR-DRAIN & SC
BL-BLISTERS
RG-RIDGES
SP-SPLITS
HL-HOLES
SR-SURF DET
SL-SLIPPAGE
PA-PATCHING
DV-DEBRIS & VEG
EQ-EQ SUPPORT
PD-PONDING



I.D. #	DIS	SEV	DEF	QTY
BF	2	L		288
BF	2	L		288
BF	3	L		288
BF	2	M		288

216
72
288

SCALE: ____

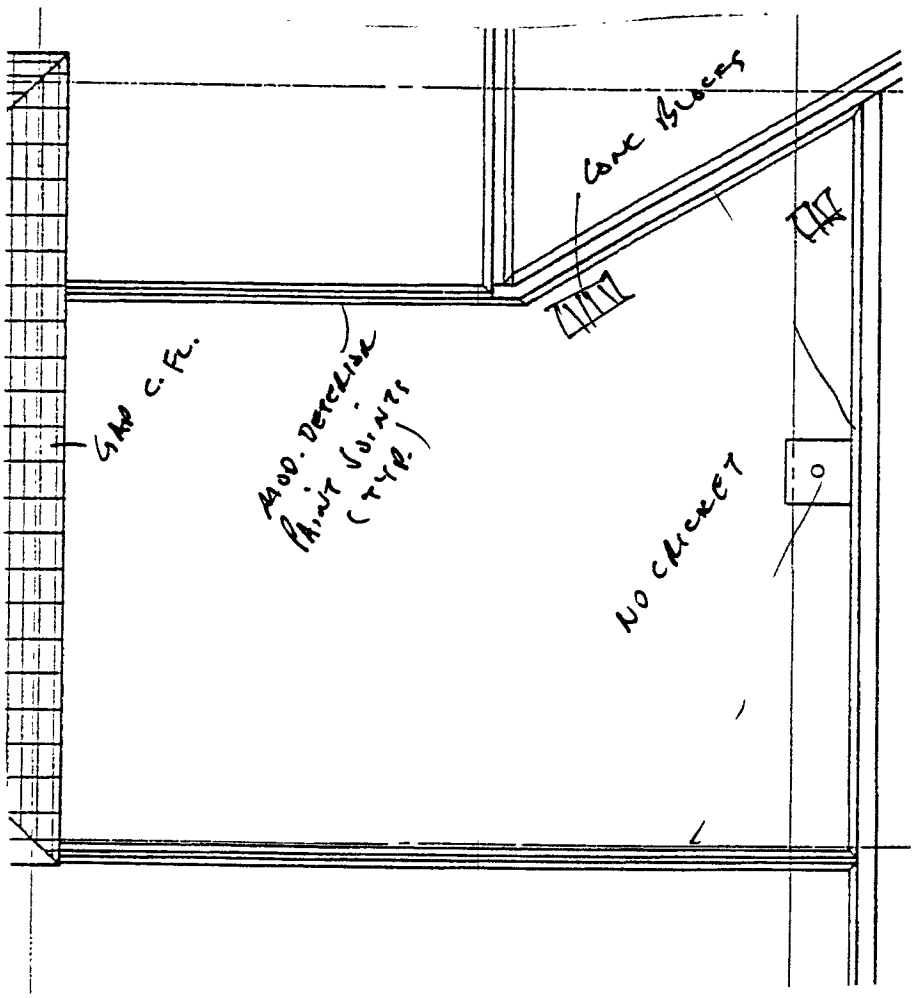
NORTH

IP12_003995

IDP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:
BUILDING Administration PER. FLASHING 152 LF	DATE
SECTION F CURB FLASHING LF	NAME

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING



ID #	DIS	SEV	DEF	QTY
BF	2	L		152
RD	2	M		1
BF	2	L		152
BF	3	L		152
BF	2	M		152
DR	1	M		1

SCALE: _____

NORTH

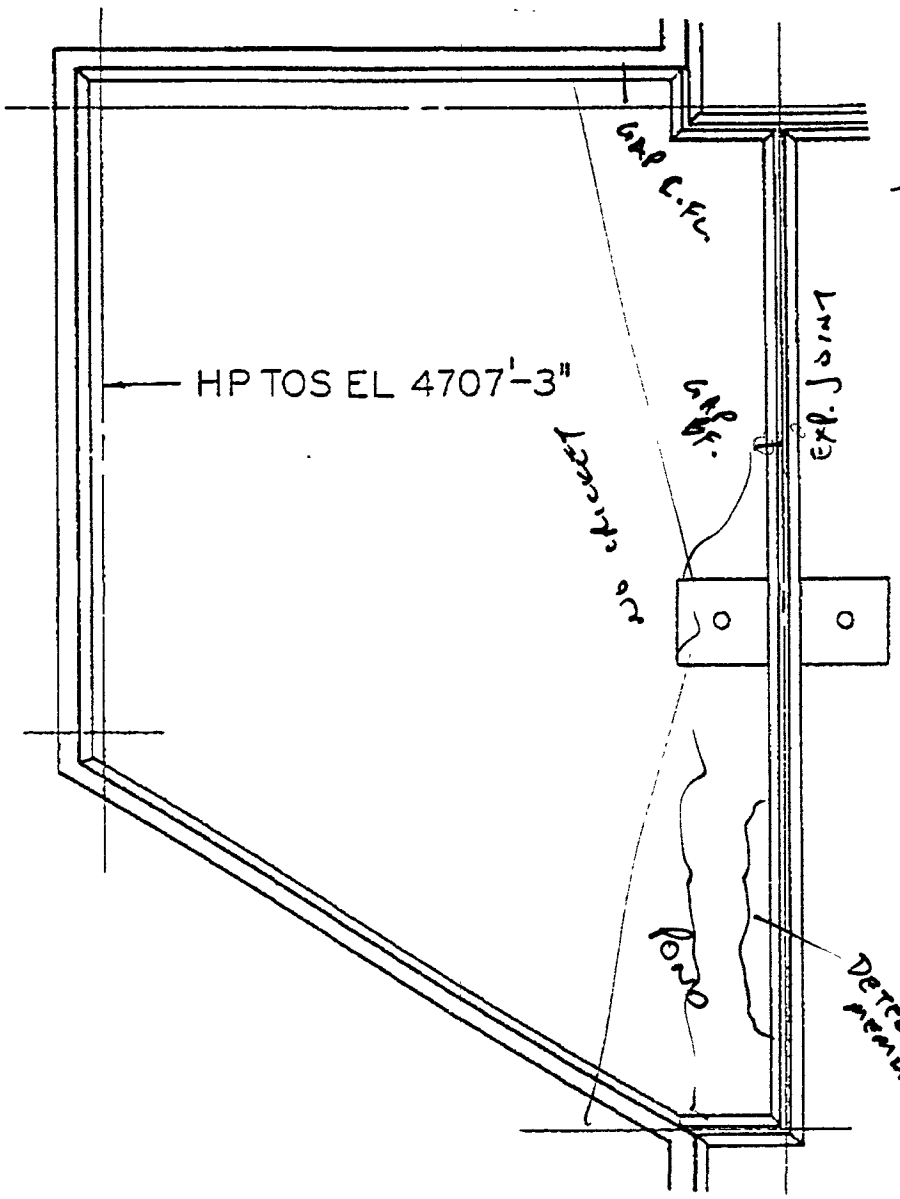
IPP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:

BUILDING Administration PER. FLASHING 100 LF DATE _____

SECTION G CURB FLASHING _____ LF NAME _____

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING



ID #	DIS	SEV	DEF	QTY
BF	2	L		100
PD	6	L		100
SR	9	M		25
RD	2	M		1
BF	2	L		100
BF	3	L		100
BF	2	M		100
PD	1	L		100
SP	1	M		25
DR	1	M		1

SCALE: _____

NORTH

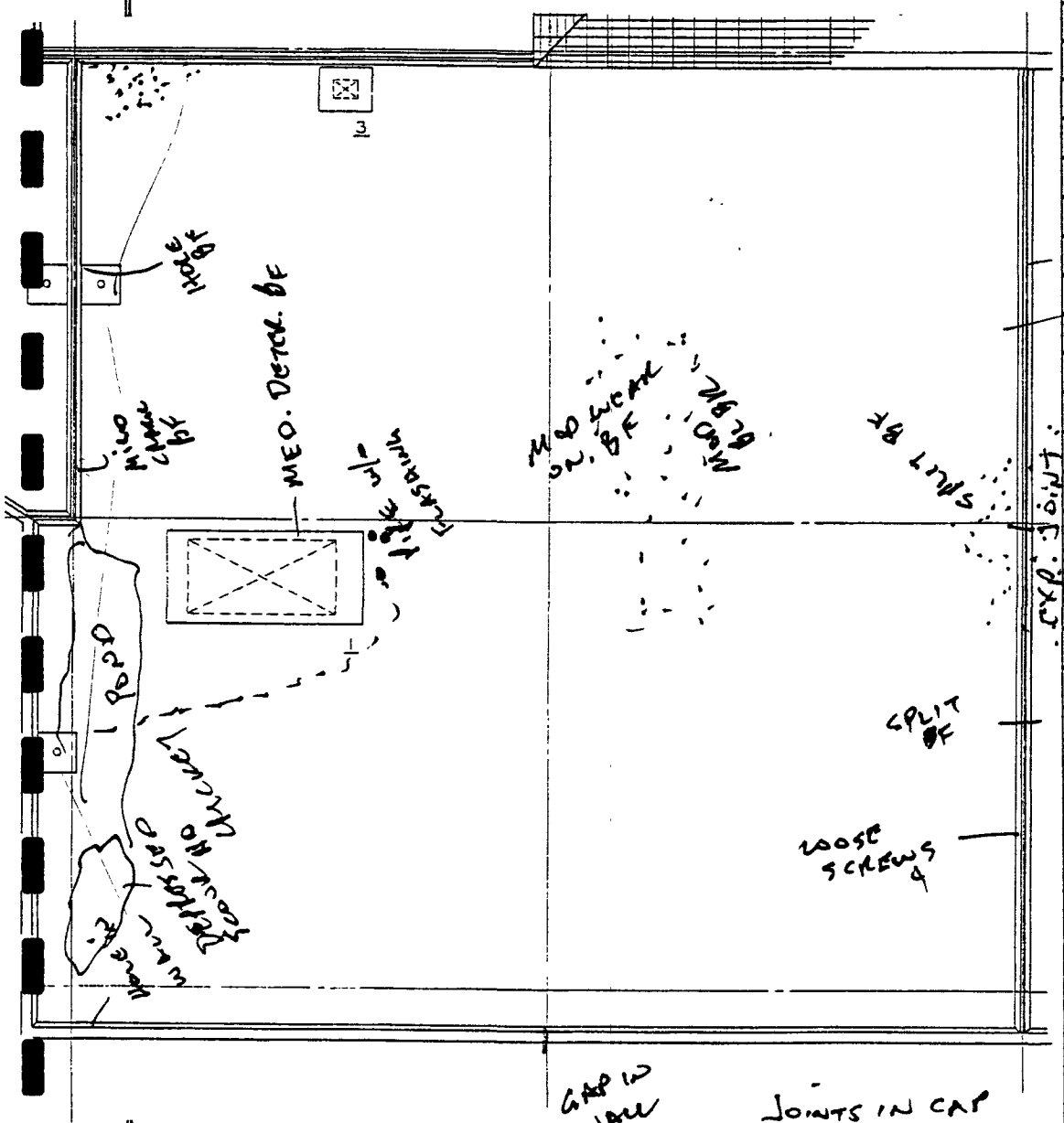
IP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:

BUILDING Administration PER. FLASHING 308 LF DATE _____

SECTION H CURB FLASHING 48 LF NAME _____

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING



ID #	DIS	SEV	DEF	QTY
BF	2	L		308
BF	2	L		48
RD	2	M		2
PD	6	L		120
BF	13	H		2
BF	14	H		2
BF	12	H		2
BF	1	H		6
BF	2	L		356
BF	3	L		356
BF	2	M		356
DR	1	M		2
PD	1	L		120

SCALE: _____

NORTH

IP12_003998

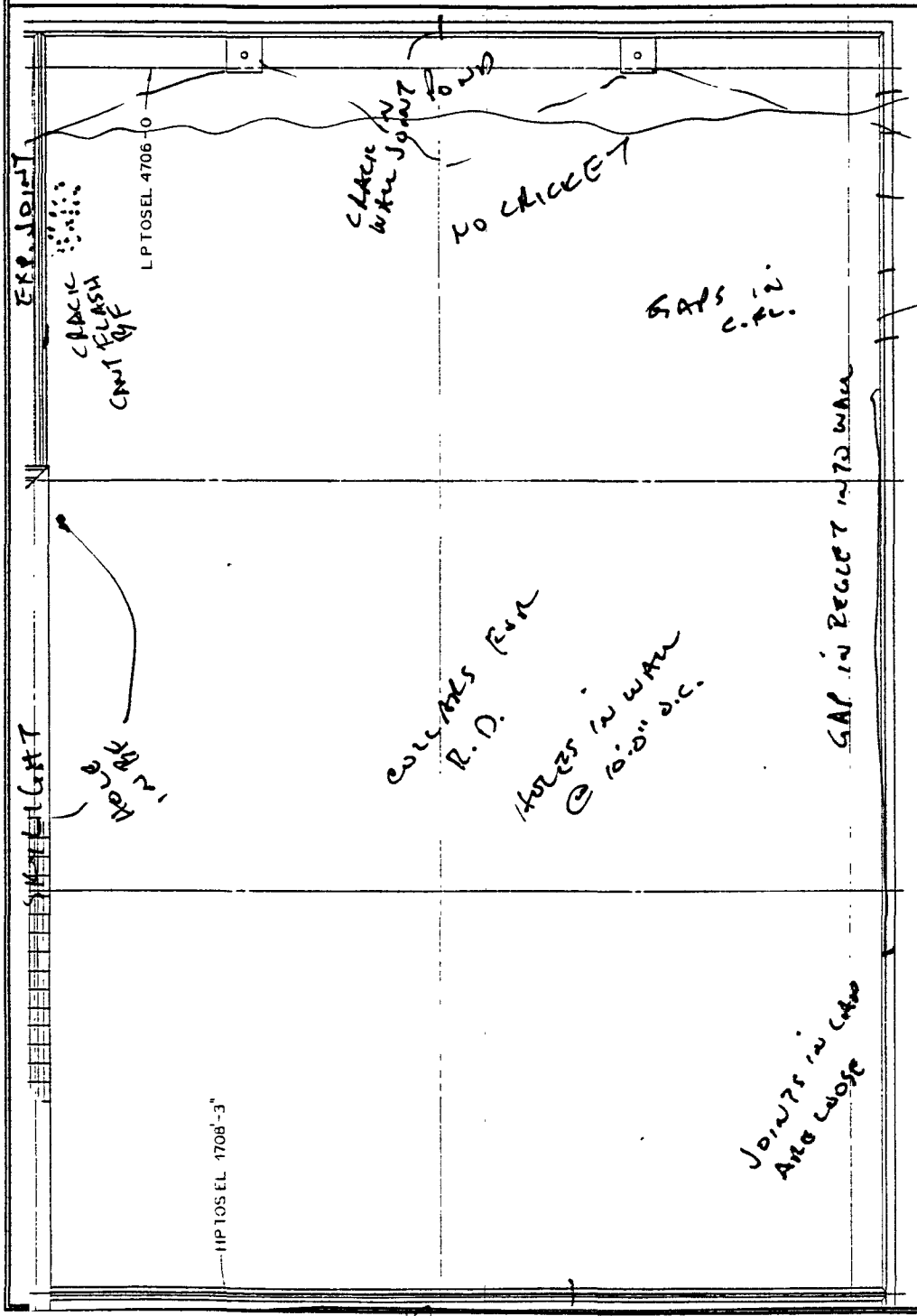
I DP

ROOF INSPECTION WORKSHEET	AGENCY/INST.:
BUILDING Administration	PER. FLASHING 376 LF
SECTION T	CURB FLASHING LF

DATE

NAME

BF-BASE FLASH	PP-PITCH PANS	SP-SPLITS	PA-PATCHING
MC-METAL CAP	DR-DRAIN & SC	HL-HOLES	DV-DEBRIS & VEG
EM-EMBEDD MET	BL-BLISTERS	SR-SURF DET	EQ-EQ SUPPORT
FP-FLASHED PEN	RG-RIDGES	SL-SLIPPAGE	PD-PONDING



ID #	DIS	SEV	DEF	QTY
BF	2	L		376
BF	13	H		2
BF	14	H		2
PD	6	L		308
RD	2	M		2
BF	2	L		376
BF	3	L		376
BF	2	M		376
BF	1	H		4
PD	1	L		308
DR	1	M		2

222
154
376

62

IP12_003999

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAA - Administration - A

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 5929 SqFt

Flashing Length: 308 Ft Perimeter: 308 Ft Curb: 0 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 88 Rating: Excellent
ICI of Section: None Rating: None

RCI of Section: 63 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	H	4	1.30	9.8
BF	BASE FLASHING	M	308	100.00	50.3
BF	BASE FLASHING	L	616	200.00	20.1
DR	DRAIN & SCUPPER	M	2	0.65	14.2
MC	METAL CAP	M	60	19.48	17.1
MC	METAL CAP	L	10	3.25	5.1

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
PD	PONDING	L	308	5.19	12.2

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAB - Administration - B

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 8235 SqFt

Flashing Length: 400 Ft Perimeter: 172 Ft Curb: 228 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 100 Rating: Excellent
ICI of Section: None Rating: None

RCI of Section: 65 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	H	2	0.50	6.7
BF	BASE FLASHING	M	400	100.00	50.3
BF	BASE FLASHING	L	800	200.00	20.1
DR	DRAIN & SCUPPER	M	2	0.50	12.1
MC	METAL CAP	M	20	5.00	12.1
MC	METAL CAP	L	10	2.50	4.4

Membrane Distresses

Distress Type	Severity	Quantity	Density	Deduct

None

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAC - Administration - C

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 1270 SqFt

Flashing Length: 166 Ft Perimeter: 150 Ft Curb: 16 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 73 Rating: Very Good
ICI of Section: None Rating: None

RCI of Section: 61 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	H	2	1.20	9.4
BF	BASE FLASHING	M	166	100.00	50.3
BF	BASE FLASHING	L	332	200.00	20.1
DR	DRAIN & SCUPPER	M	1	0.60	13.6
MC	METAL CAP	M	25	15.06	16.1

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
PD	PONDING	L	200	15.75	26.0
SR	SURFACE DET	M	16	1.26	11.6

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAD - Administration - D

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 1476 SqFt

Flashing Length: 154 Ft Perimeter: 36 Ft Curb: 118 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 81 Rating: Very Good
ICI of Section: None Rating: None

RCI of Section: 62 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	M	154	100.00	50.3
BF	BASE FLASHING	L	308	200.00	20.1
DR	DRAIN & SCUPPER	M	1	0.65	14.2
MC	METAL CAP	M	10	6.49	13.0

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
PD	PONDING	L	144	9.76	19.0

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAF - Administration - F

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 1220 SqFt

Flashing Length: 152 Ft Perimeter: 56 Ft Curb: 96 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 98 Rating: Excellent
ICI of Section: None Rating: None

RCI of Section: 65 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	M	152	100.00	50.3
BF	BASE FLASHING	L	304	200.00	20.1
DR	DRAIN & SCUPPER	M	1	0.66	14.3
MC	METAL CAP	M	5	3.29	10.6

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
DV	DEBRIS & VEG	M	10	0.82	2.2

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAG - Administration - G

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 429 SqFt

Flashing Length: 100 Ft Perimeter: 64 Ft Curb: 36 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 66 Rating: Good
ICI of Section: None Rating: None

RCI of Section: 60 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	M	100	100.00	50.3
BF	BASE FLASHING	L	200	200.00	20.1
DR	DRAIN & SCUPPER	M	1	1.00	17.5
MC	METAL CAP	M	5	5.00	12.1

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
PD	PONDING	L	100	23.31	33.2
SR	SURFACE DET	M	25	5.83	16.0

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAH - Administration - H

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 5929 SqFt

Flashing Length: 356 Ft Perimeter: 107 Ft Curb: 249 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 94 Rating: Excellent
ICI of Section: None Rating: None

RCI of Section: 64 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	H	5	1.40	10.2
BF	BASE FLASHING	M	356	100.00	50.3
BF	BASE FLASHING	L	712	200.00	20.1
DR	DRAIN & SCUPPER	M	2	0.56	13.0
MC	METAL CAP	M	15	4.21	11.4

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
PD	PONDING	L	120	2.02	6.2

Date: JUN/27/2001	Visual Inspection Summary	Page 1

Installation: IPP - Intermountain Power Project

Date Inspected: 05/17/2001
Building: 9BSE-A - Administration Building
Section: 9BSEAI - Administration - I

Category Code: 61021 Administrative Facilities
Administrative Buildings
Engineer Administration Building

Roof Section Area: 8547 SqFt

Flashing Length: 376 Ft Perimeter: 188 Ft Curb: 188 Ft

FCI of Section: 50 Rating: Fair
MCI of Section: 89 Rating: Excellent
ICI of Section: None Rating: None

RCI of Section: 63 Rating: MODERATE REPAIRS NEEDED

Flashing Distresses

Distress Type		Severity	Quantity	Density	Deduct
BF	BASE FLASHING	H	4	1.06	8.9
BF	BASE FLASHING	M	376	100.00	50.3
BF	BASE FLASHING	L	752	200.00	20.1
DR	DRAIN & SCUPPER	M	2	0.53	12.6
MC	METAL CAP	M	50	13.30	15.7

Membrane Distresses

Distress Type		Severity	Quantity	Density	Deduct
PD	PONDING	L	400	4.68	11.4

Maintenance, Repair & Replacement Analysis

Building:	9BSE-A - Administration Building	Area Cost Index:	$1.00
Section:	9BSEAA	Roof Replacement Cost:	$5.25 per SF
Section Area:	5929	Insulation Replacement Cost:	$8.00 per SF

Originally Constructed/Last Replaced:	1985	Visual Inspection Date:	5/17/2001
Current Age:	16 Year(s)	Insulation Inspection Date:	--------

Predicted Year of Replacement (w/o repairs):			2006				
Additional Service Life (w/repairs):			5	Year(s)		Current	Improved
Predicted Year of Replacement (w/repairs):			2011		ICI	100	100
					FCI	50	80
Cost for Repairs:	$	3214.00	642.80	$/year	MCI	88	88
Cost for Replacement:	$	31127.25	1556.00	$/year	RCI	63	84

Adjusted Repair/Replace Ratio = 0.57 Recommendation: Repair

IP12_004008

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAA	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	5929
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 31127.25

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAA	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	5929
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 3214.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 308 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	BF-H-1 4 LF	Repair damaged base flashing by overlaying each localized defect with new base flashing. [4]
6.	DR-M-1 2	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [6]
7.	MC-M-2 60 LF	Reseal failed joints in metal coping cap and reattach. [7]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAA | Area: 5929 SF | Age: 16

Total Repair Costs	$	3214	Replacement Cost @ 5.25 SF	$	31127
Additional Service Life		5 Yrs			
Total Repair Cost/ Additional Service Life	$	642.80 $/Yr	Replacement Cost/20 Years	$	1556 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.41$$

Adjusted Ratio = Ratio + (0.01 * Age) = 0.57

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37		
BL-M-1	2.08		
DV-H-1	37.48		
DV-M-1	5.69		
DV-M-2	24.06		
DV-M-3	5.69		
EQ-H-1	87.78		
EQ-H-2	156.73		
EQ-M-1	311.06		
EQ-M-2	156.73		
HL-H-1	24.39		
PA-H-1	13.43		
PA-M-1	13.43		
RG-H-1	20.90		
RG-H-2	25.37		
RG-M-1	2.09		
SL-H-1	18.94		
SP-H-1	16.85		
SR-H-1	6.05		
SR-H-2	4.31		
SR-H-3	4.14		
SR-H-4	25.44		
SR-M-1	2.09		
SR-M-2	2.41		
SR-M-3	1.17		
SR-M-4	3.54		

DIS-SL-DF	Unit Cost	Qty	Total Cost

IP12_004011

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAA | Area: 5929 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37	4	$ 93.48
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	308	$ 1472.24
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	2	$ 43.96
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	60	$ 1091.40
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004012

Maintenance, Repair & Replacement Analysis

Building:	9BSE-A - Administration Building	Area Cost Index:	$1.00
Section:	9BSEAB	Roof Replacement Cost:	$5.25 per SF
Section Area:	8235	Insulation Replacement Cost:	$8.00 per SF

Originally Constructed/Last Replaced:	1985	Visual Inspection Date:	5/17/2001
Current Age:	16 Year(s)	Insulation Inspection Date:	--------

Predicted Year of Replacement (w/o repairs):			2007				
Additional Service Life (w/repairs):			5	Year(s)		Current	Improved
Predicted Year of Replacement (w/repairs):			2012		ICI	100	100
					FCI	50	80
Cost for Repairs:	$	2881.00	576.20	$/year	MCI	100	100
Cost for Replacement:	$	43233.75	2162.00	$/year	RCI	65	86

Adjusted Repair/Replace Ratio = 0.43 Recommendation: Repair

IP12_004013

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAB	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	8235
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 43233.75

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2007

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAB	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	8235
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 2881.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 400 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	BF-H-1 2 LF	Repair damaged base flashing by overlaying each localized defect with new base flashing. [4]
5.	DR-M-1 2	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [5]
6.	MC-M-2 20 LF	Reseal failed joints in metal coping cap and reattach. [6]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAB | Area: 8235 SF | Age: 16

Total Repair Costs	$	2881		Replacement Cost @ 5.25 SF	$	43234	
Additional Service Life		5	Yrs				
Total Repair Cost/ Additional Service Life	$	576.20	$/Yr	Replacement Cost/20 Years	$	2162	$/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.27$$

Adjusted Ratio = Ratio + (0.01 * Age) = 0.43

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37		
BL-M-1	2.08		
DV-H-1	37.48		
DV-M-1	5.69		
DV-M-2	24.06		
DV-M-3	5.69		
EQ-H-1	87.78		
EQ-H-2	156.73		
EQ-M-1	311.06		
EQ-M-2	156.73		
HL-H-1	24.39		
PA-H-1	13.43		
PA-M-1	13.43		
RG-H-1	20.90		
RG-H-2	25.37		
RG-M-1	2.09		
SL-H-1	18.94		
SP-H-1	16.85		
SR-H-1	6.05		
SR-H-2	4.31		
SR-H-3	4.14		
SR-H-4	25.44		
SR-M-1	2.09		
SR-M-2	2.41		
SR-M-3	1.17		
SR-M-4	3.54		

DIS-SL-DF	Unit Cost	Qty	Total Cost

IP12_004016

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAB | Area: 8235 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37	2	$ 46.74
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	400	$ 1912.00
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	2	$ 43.96
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	20	$ 363.80
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004017

Maintenance, Repair & Replacement Analysis

Building: 9BSE-A - Administration Building
Section: 9BSEAC
Section Area: 1270

Area Cost Index: $1.00
Roof Replacement Cost: $5.25 per SF
Insulation Replacement Cost: $8.00 per SF

Originally Constructed/Last Replaced: 1985
Current Age: 16 Year(s)

Visual Inspection Date: 5/17/2001
Insulation Inspection Date: --------

Predicted Year of Replacement (w/o repairs): 2006
Additional Service Life (w/repairs): 4 Year(s)
Predicted Year of Replacement (w/repairs): 2010

					Current	Improved
				ICI	100	100
				FCI	50	80
Cost for Repairs:	$ 1864.00	466.00	$/year	MCI	73	74
Cost for Replacement:	$ 6667.50	333.00	$/year	RCI	61	79

Adjusted Repair/Replace Ratio = 1.56

Recommendation: Replace

IP12_004018

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAC	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	1270
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 6667.50

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAC	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	1270
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 1864.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 166 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	BF-H-1 2 LF	Repair damaged base flashing by overlaying each localized defect with new base flashing. [4]
5.	SR-M-1 16 SF	Reinstall aggregate on exposed membrane surfaces. [5]
7.	DR-M-1 1	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [7]
8.	MC-M-2 25 LF	Reseal failed joints in metal coping cap and reattach. [8]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAC | Area: 1270 SF | Age: 16

Total Repair Costs	$	1864		Replacement Cost @ 5.25 SF	$	6668	
Additional Service Life		4	Yrs				
Total Repair Cost/ Additional Service Life	$	466.00	$/Yr	Replacement Cost/20 Years	$	333	$/Yr

Cost Analysis — Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 1.40$$

Adjusted Ratio = Ratio + (0.01 * Age) = 1.56

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost	DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37						
BL-M-1	2.08						
DV-H-1	37.48						
DV-M-1	5.69						
DV-M-2	24.06						
DV-M-3	5.69						
EQ-H-1	87.78						
EQ-H-2	156.73						
EQ-M-1	311.06						
EQ-M-2	156.73						
HL-H-1	24.39						
PA-H-1	13.43						
PA-M-1	13.43						
RG-H-1	20.90						
RG-H-2	25.37						
RG-M-1	2.09						
SL-H-1	18.94						
SP-H-1	16.85						
SR-H-1	6.05						
SR-H-2	4.31						
SR-H-3	4.14						
SR-H-4	25.44						
SR-M-1	2.09	16	$ 33.44				
SR-M-2	2.41						
SR-M-3	1.17						
SR-M-4	3.54						

IP12_004021

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAC | Area: 1270 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty		Total Cost
BF-H-1	23.37	2	$	46.74
BF-H-2	9.97			
BF-H-3	30.69			
BF-M-1	4.72			
BF-M-2	4.78	166	$	793.48
BF-M-3	5.88			
BF-M-4	19.03			
DR-H-1	27.51			
DR-H-2	51.45			
DR-H-3	47.43			
DR-H-4	102.21			
DR-M-1	21.98	1	$	21.98
DR-M-2	34.20			
DR-M-3	19.54			
EM-H-1	6.63			
EM-H-2	8.56			
EM-H-3	14.60			
EM-H-4	7.63			
EM-H-5	21.16			
EM-M-2	6.46			
EM-M-3	6.68			
EM-M-4	6.80			
FP-H-1	16.82			
FP-H-2	47.26			
FP-H-3	82.84			
FP-H-4	22.88			
FP-M-1	4.81			
FP-M-2	5.78			
FP-M-3	31.07			
FP-M-4	19.54			
MC-H-1	9.50			
MC-H-2	9.44			
MC-H-3	5.37			
MC-M-1	15.41			
MC-M-2	18.19	25	$	454.75
MC-M-3	8.11			
MC-M-4	4.00			
MC-M-5	6.63			
PP-H-1	19.54			
PP-H-2	37.47			
PP-H-3	21.98			
PP-H-4	51.69			

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004022

Maintenance, Repair & Replacement Analysis

Building: 9BSE-A - Administration Building
Section: 9BSEAD
Section Area: 1476

Area Cost Index: $1.00
Roof Replacement Cost: $5.25 per SF
Insulation Replacement Cost: $8.00 per SF

Originally Constructed/Last Replaced: 1985
Current Age: 16 Year(s)

Visual Inspection Date: 5/17/2001
Insulation Inspection Date: --------

Predicted Year of Replacement (w/o repairs): 2006
Additional Service Life (w/repairs): 5 Year(s)
Predicted Year of Replacement (w/repairs): 2011

						Current	Improved
					ICI	100	100
					FCI	50	80
Cost for Repairs:	$	1454.00	290.80	$/year	MCI	81	81
Cost for Replacement:	$	7749.00	387.00	$/year	RCI	62	83

Adjusted Repair/Replace Ratio = 0.91

Recommendation: Marginal

IP12_004023

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAD	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	1476
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	VINYL	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 7749.00

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAD	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	1476
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	VINYL	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 1454.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3. BF-M-2 154 LF — Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]

5. DR-M-1 1 — Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [5]

6. MC-M-2 10 LF — Reseal failed joints in metal coping cap and reattach. [6]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAD | Area: 1476 SF | Age: 16

Total Repair Costs	$	1454	Replacement Cost @ 5.25 SF	$	7749
Additional Service Life		5 Yrs			
Total Repair Cost/ Additional Service Life	$	290.80 $/Yr	Replacement Cost/20 Years	$	387 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.75$$

Adjusted Ratio = Ratio + (0.01 * Age) = 0.91

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost	DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37						
BL-M-1	2.08						
DV-H-1	37.48						
DV-M-1	5.69						
DV-M-2	24.06						
DV-M-3	5.69						
EQ-H-1	87.78						
EQ-H-2	156.73						
EQ-M-1	311.06						
EQ-M-2	156.73						
HL-H-1	24.39						
PA-H-1	13.43						
PA-M-1	13.43						
RG-H-1	20.90						
RG-H-2	25.37						
RG-M-1	2.09						
SL-H-1	18.94						
SP-H-1	16.85						
SR-H-1	6.05						
SR-H-2	4.31						
SR-H-3	4.14						
SR-H-4	25.44						
SR-M-1	2.09						
SR-M-2	2.41						
SR-M-3	1.17						
SR-M-4	3.54						

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAD | Area: 1476 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37		
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	154	$ 736.12
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	1	$ 21.98
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	10	$ 181.90
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004027

Maintenance, Repair & Replacement Analysis

Building: 9BSE-A - Administration Building
Section: 9BSEAF
Section Area: 1220

Area Cost Index: $1.00
Roof Replacement Cost: $5.25 per SF
Insulation Replacement Cost: $8.00 per SF

Originally Constructed/Last Replaced: 1985
Current Age: 16 Year(s)

Visual Inspection Date: 5/17/2001
Insulation Inspection Date: --------

Predicted Year of Replacement (w/o repairs): 2007
Additional Service Life (w/repairs): 5 Year(s)
Predicted Year of Replacement (w/repairs): 2012

					Current	Improved
				ICI	100	100
				FCI	50	80
Cost for Repairs:	$ 1411.00	282.20	$/year	MCI	98	100
Cost for Replacement:	$ 6405.00	320.00	$/year	RCI	65	86

Adjusted Repair/Replace Ratio = 1.04

Recommendation: Marginal

IP12_004028

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAF	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	1220
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 6405.00

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2007

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAF	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	1220
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 1411.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 152 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	DR-M-1 1	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [4]
5.	MC-M-2 5 LF	Reseal failed joints in metal coping cap and reattach. [5]
6.	DV-M-1 10 SF	Remove foreign objects from roof. [6]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAF | Area: 1220 SF | Age: 16

Total Repair Costs	$	1411	Replacement Cost @ 5.25 SF	$	6405
Additional Service Life		5 Yrs			
Total Repair Cost/ Additional Service Life	$	282.20 $/Yr	Replacement Cost/20 Years	$	320 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.88$$

Adjusted Ratio = Ratio + (0.01 * Age) = 1.04

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37		
BL-M-1	2.08		
DV-H-1	37.48		
DV-M-1	5.69	10	$ 56.90
DV-M-2	24.06		
DV-M-3	5.69		
EQ-H-1	87.78		
EQ-H-2	156.73		
EQ-M-1	311.06		
EQ-M-2	156.73		
HL-H-1	24.39		
PA-H-1	13.43		
PA-M-1	13.43		
RG-H-1	20.90		
RG-H-2	25.37		
RG-M-1	2.09		
SL-H-1	18.94		
SP-H-1	16.85		
SR-H-1	6.05		
SR-H-2	4.31		
SR-H-3	4.14		
SR-H-4	25.44		
SR-M-1	2.09		
SR-M-2	2.41		
SR-M-3	1.17		
SR-M-4	3.54		

DIS-SL-DF	Unit Cost	Qty	Total Cost

IP12_004031

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAF | Area: 1220 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37		
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	152	$ 726.56
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	1	$ 21.98
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	5	$ 90.95
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004032

Maintenance, Repair & Replacement Analysis

Building: 9BSE-A - Administration Building
Section: 9BSEAG
Section Area: 429

Area Cost Index: $1.00
Roof Replacement Cost: $5.25 per SF
Insulation Replacement Cost: $8.00 per SF

Originally Constructed/Last Replaced: 1985
Current Age: 16 Year(s)

Visual Inspection Date: 5/17/2001
Insulation Inspection Date: --------

Predicted Year of Replacement (w/o repairs): 2006
Additional Service Life (w/repairs): 3 Year(s)
Predicted Year of Replacement (w/repairs): 2009

						Current	Improved
					ICI	100	100
					FCI	50	80
Cost for Repairs:	$	1157.00	385.67	$/year	MCI	66	67
Cost for Replacement:	$	2252.25	113.00	$/year	RCI	60	74

Adjusted Repair/Replace Ratio = 3.58

Recommendation: Replace

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAG	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	429
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 2252.25

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAG	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	429
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 1157.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 100 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
5.	SR-M-1 25 SF	Reinstall aggregate on exposed membrane surfaces. [5]
6.	DR-M-1 1	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [6]
7.	MC-M-2 5 LF	Reseal failed joints in metal coping cap and reattach. [7]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAG | Area: 429 SF | Age: 16

Total Repair Costs	$	1157		Replacement Cost @ 5.25 SF	$	2252	
Additional Service Life		3	Yrs				
Total Repair Cost/ Additional Service Life	$	385.67	$/Yr	Replacement Cost/20 Years	$	113	$/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 3.42$$

Adjusted Ratio = Ratio + (0.01 * Age) = 3.58

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37		
BL-M-1	2.08		
DV-H-1	37.48		
DV-M-1	5.69		
DV-M-2	24.06		
DV-M-3	5.69		
EQ-H-1	87.78		
EQ-H-2	156.73		
EQ-M-1	311.06		
EQ-M-2	156.73		
HL-H-1	24.39		
PA-H-1	13.43		
PA-M-1	13.43		
RG-H-1	20.90		
RG-H-2	25.37		
RG-M-1	2.09		
SL-H-1	18.94		
SP-H-1	16.85		
SR-H-1	6.05		
SR-H-2	4.31		
SR-H-3	4.14		
SR-H-4	25.44		
SR-M-1	2.09	25	$ 52.25
SR-M-2	2.41		
SR-M-3	1.17		
SR-M-4	3.54		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAG | Area: 429 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37		
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	100	$ 478.00
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	1	$ 21.98
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	5	$ 90.95
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004037

Maintenance, Repair & Replacement Analysis

Building: 9BSE-A - Administration Building
Section: 9BSEAG
Section Area: 429

Area Cost Index: $1.00
Roof Replacement Cost: $5.25 per SF
Insulation Replacement Cost: $8.00 per SF

Originally Constructed/Last Replaced: 1985
Current Age: 16 Year(s)

Visual Inspection Date: 5/17/2001
Insulation Inspection Date: --------

Predicted Year of Replacement (w/o repairs): 2006
Additional Service Life (w/repairs): 3 Year(s)
Predicted Year of Replacement (w/repairs): 2009

						Current	Improved
					ICI	100	100
					FCI	50	80
Cost for Repairs:	$	1157.00	385.67	$/year	MCI	66	67
Cost for Replacement:	$	2252.25	113.00	$/year	RCI	60	74

Adjusted Repair/Replace Ratio = 3.58

Recommendation: Replace

IP12_004038

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAG	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	429
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 2252.25

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAG	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	429
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 1157.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 100 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
5.	SR-M-1 25 SF	Reinstall aggregate on exposed membrane surfaces. [5]
6.	DR-M-1 1	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [6]
7.	MC-M-2 5 LF	Reseal failed joints in metal coping cap and reattach. [7]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAG | Area: 429 SF | Age: 16

Total Repair Costs	$	1157		Replacement Cost @ 5.25 SF	$	2252
Additional Service Life		3	Yrs			
Total Repair Cost/ Additional Service Life	$	385.67	$/Yr	Replacement Cost/20 Years	$	113 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 3.42$$

Adjusted Ratio = Ratio + (0.01 * Age) = 3.58

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37		
BL-M-1	2.08		
DV-H-1	37.48		
DV-M-1	5.69		
DV-M-2	24.06		
DV-M-3	5.69		
EQ-H-1	87.78		
EQ-H-2	156.73		
EQ-M-1	311.06		
EQ-M-2	156.73		
HL-H-1	24.39		
PA-H-1	13.43		
PA-M-1	13.43		
RG-H-1	20.90		
RG-H-2	25.37		
RG-M-1	2.09		
SL-H-1	18.94		
SP-H-1	16.85		
SR-H-1	6.05		
SR-H-2	4.31		
SR-H-3	4.14		
SR-H-4	25.44		
SR-M-1	2.09	25	$ 52.25
SR-M-2	2.41		
SR-M-3	1.17		
SR-M-4	3.54		

DIS-SL-DF	Unit Cost	Qty	Total Cost

IP12_004041

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAG | Area: 429 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty		Total Cost
BF-H-1	23.37			
BF-H-2	9.97			
BF-H-3	30.69			
BF-M-1	4.72			
BF-M-2	4.78	100	$	478.00
BF-M-3	5.88			
BF-M-4	19.03			
DR-H-1	27.51			
DR-H-2	51.45			
DR-H-3	47.43			
DR-H-4	102.21			
DR-M-1	21.98	1	$	21.98
DR-M-2	34.20			
DR-M-3	19.54			
EM-H-1	6.63			
EM-H-2	8.56			
EM-H-3	14.60			
EM-H-4	7.63			
EM-H-5	21.16			
EM-M-2	6.46			
EM-M-3	6.68			
EM-M-4	6.80			
FP-H-1	16.82			
FP-H-2	47.26			
FP-H-3	82.84			
FP-H-4	22.88			
FP-M-1	4.81			
FP-M-2	5.78			
FP-M-3	31.07			
FP-M-4	19.54			
MC-H-1	9.50			
MC-H-2	9.44			
MC-H-3	5.37			
MC-M-1	15.41			
MC-M-2	18.19	5	$	90.95
MC-M-3	8.11			
MC-M-4	4.00			
MC-M-5	6.63			
PP-H-1	19.54			
PP-H-2	37.47			
PP-H-3	21.98			
PP-H-4	51.69			

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004042

Maintenance, Repair & Replacement Analysis

Building:	9BSE-A - Administration Building	Area Cost Index:	$1.00
Section:	9BSEAH	Roof Replacement Cost:	$5.25 per SF
Section Area:	5929	Insulation Replacement Cost:	$8.00 per SF

Originally Constructed/Last Replaced:	1985	Visual Inspection Date:	5/17/2001
Current Age:	16 Year(s)	Insulation Inspection Date:	--------

Predicted Year of Replacement (w/o repairs):			2006				
Additional Service Life (w/repairs):			6	Year(s)		Current	Improved
Predicted Year of Replacement (w/repairs):			2012		ICI	100	100
					FCI	50	80
Cost for Repairs:	$	2650.00	441.67	$/year	MCI	94	94
Cost for Replacement:	$	31127.25	1556.00	$/year	RCI	64	85

Adjusted Repair/Replace Ratio = 0.44 Recommendation: Repair

IP12_004043

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAH	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	5929
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 31127.25

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAH	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	5929
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 2650.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 356 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	BF-H-1 5 LF	Repair damaged base flashing by overlaying each localized defect with new base flashing. [4]
5.	DR-M-1 2	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [5]
7.	MC-M-2 15 LF	Reseal failed joints in metal coping cap and reattach. [7]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAH | Area: 5929 SF | Age: 16

Total Repair Costs	$	2650	Replacement Cost @ 5.25 SF	$	31127
Additional Service Life		6 Yrs			
Total Repair Cost/ Additional Service Life	$	441.67 $/Yr	Replacement Cost/20 Years	$	1556 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.28$$

Adjusted Ratio = Ratio + (0.01 * Age) = 0.44

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost	DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37						
BL-M-1	2.08						
DV-H-1	37.48						
DV-M-1	5.69						
DV-M-2	24.06						
DV-M-3	5.69						
EQ-H-1	87.78						
EQ-H-2	156.73						
EQ-M-1	311.06						
EQ-M-2	156.73						
HL-H-1	24.39						
PA-H-1	13.43						
PA-M-1	13.43						
RG-H-1	20.90						
RG-H-2	25.37						
RG-M-1	2.09						
SL-H-1	18.94						
SP-H-1	16.85						
SR-H-1	6.05						
SR-H-2	4.31						
SR-H-3	4.14						
SR-H-4	25.44						
SR-M-1	2.09						
SR-M-2	2.41						
SR-M-3	1.17						
SR-M-4	3.54						

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAH | Area: 5929 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37	5	$ 116.85
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	356	$ 1701.68
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	2	$ 43.96
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	15	$ 272.85
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004047

Maintenance, Repair & Replacement Analysis

Building: 9BSE-A - Administration Building
Section: 9BSEAI
Section Area: 8547

Area Cost Index: $1.00
Roof Replacement Cost: $5.25 per SF
Insulation Replacement Cost: $8.00 per SF

Originally Constructed/Last Replaced: 1985
Current Age: 16 Year(s)

Visual Inspection Date: 5/17/2001
Insulation Inspection Date: --------

Predicted Year of Replacement (w/o repairs): 2006
Additional Service Life (w/repairs): 5 Year(s)
Predicted Year of Replacement (w/repairs): 2011

					Current	Improved
				ICI	100	100
				FCI	50	80
Cost for Repairs:	$ 3358.00	671.60	$/year	MCI	89	89
Cost for Replacement:	$ 44871.75	2244.00	$/year	RCI	63	84

Adjusted Repair/Replace Ratio = 0.46

Recommendation: Repair

IP12_004048

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAI	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	8547
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 44871.75

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAI	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	8547
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 3358.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 376 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	BF-H-1 4 LF	Repair damaged base flashing by overlaying each localized defect with new base flashing. [4]
6.	DR-M-1 2	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [6]
7.	MC-M-2 50 LF	Reseal failed joints in metal coping cap and reattach. [7]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project

Building/Section: 9BSE-A 9BSEAI | Area: 8547 SF | Age: 16

Total Repair Costs	$	3358		Replacement Cost @ 5.25 SF	$	44872
Additional Service Life		5	Yrs			
Total Repair Cost/ Additional Service Life	$	671.60	$/Yr	Replacement Cost/20 Years	$	2244 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.30$$

Adjusted Ratio = Ratio + (0.01 * Age) = 0.46

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost	DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37						
BL-M-1	2.08						
DV-H-1	37.48						
DV-M-1	5.69						
DV-M-2	24.06						
DV-M-3	5.69						
EQ-H-1	87.78						
EQ-H-2	156.73						
EQ-M-1	311.06						
EQ-M-2	156.73						
HL-H-1	24.39						
PA-H-1	13.43						
PA-M-1	13.43						
RG-H-1	20.90						
RG-H-2	25.37						
RG-M-1	2.09						
SL-H-1	18.94						
SP-H-1	16.85						
SR-H-1	6.05						
SR-H-2	4.31						
SR-H-3	4.14						
SR-H-4	25.44						
SR-M-1	2.09						
SR-M-2	2.41						
SR-M-3	1.17						
SR-M-4	3.54						

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAI | Area: 8547 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37	4	$ 93.48
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	376	$ 1797.28
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	2	$ 43.96
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	50	$ 909.50
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004052

Maintenance, Repair & Replacement Analysis

Building:	9BSE-A - Administration Building	Area Cost Index:	$1.00
Section:	9BSEAI	Roof Replacement Cost:	$5.25 per SF
Section Area:	8547	Insulation Replacement Cost:	$8.00 per SF

Originally Constructed/Last Replaced:	1985	Visual Inspection Date:	5/17/2001
Current Age:	16 Year(s)	Insulation Inspection Date:	--------

Predicted Year of Replacement (w/o repairs):			2006				
Additional Service Life (w/repairs):			5	Year(s)		Current	Improved
Predicted Year of Replacement (w/repairs):			2011		ICI	100	100
					FCI	50	80
Cost for Repairs:	$	3358.00	671.60	$/year	MCI	89	89
Cost for Replacement:	$	44871.75	2244.00	$/year	RCI	63	84

Adjusted Repair/Replace Ratio = 0.46 Recommendation: Repair

IP12_004053

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Roof Replacement

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283)

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAI	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	8547
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est Replace Cost:	$ 44871.75

CORRECTIVE ACTION RECOMMENDED: Total replacement of roof in 2006

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to totally replace the roofing system, rather than perform the necessary maintenance, repair, and/or partial replacement of the roofing system.

DESIGN CONSIDERATIONS: The following considerations should be addressed during the design and construction phases of the replacement system:

a. Type replacement systems could include
   1) bituminous built-up membrane
   2) single-ply membrane, such as EPDM, PVC etc.. If a ballasted system is selected, determine if the structural components can sustain the added weight (approx. 10 lbs/SF).

b. Ensure that the roof has positive drainage slope of at least 1/4 inches per foot. Correct all areas that now contain ponded water.

c. Remove all unnecessary roof mounted equipment.

d. Inspect and repair or replace, as necessary, all remaining roof mounted equipment.

e. Ensure that all roof mounted equipment and penetrations are properly installed on the roof.

f. Live load and dead load impacts shall be taken into account in the design.

g. Until the replacement roof is installed, accomplish temporary repairs to ensure that the roof remains leak free.

Generated: Jun/27/2001

Corrective Action Requirement Sheet

Major Repair

(Note: Attach a copy of this form, along with a copy of the Roof Inspection Worksheet to DA Form 4283

Agency/Inst.:	IPP - Intermountain Power Project	Facility No:	S1430
Bldg No./Sec:	9BSE-A 9BSEAI	Bldg Name:	Administration Building
Bldg Use:	Administration	Inspection Date:	May/2001
Membrane:	BUR: Asphalt	Area (SF):	8547
Surfacing:	AGG: Pea Gravel	Age (Yrs):	16
Vapor Ret:	UNKNOWN	Deck Type:	STEEL
Insulation:	EXPANDED POLYSTYRENE	Est. Repair Cost:	$ 3358.00

CORRECTIVE ACTION RECOMMENDED: Maintenance, Repair and/or Partial Replacement

JUSTIFICATION: An economic analysis of the roof condition, including age, indicates that it is more cost effective to accomplish the necessary maintenance, repairs and/or partial replacement of the roofing components rather than replace the roofing system. Therefore, accomplish the following actions for the above roof section.

[Note: numbers refer to identification numbers of distresses corresponding with the Roof Inspection Worksheet]

3.	BF-M-2 376 LF	Prime exposed and deteriorated base flashing and coat with heavy bodied asphalt coating. [3]
4.	BF-H-1 4 LF	Repair damaged base flashing by overlaying each localized defect with new base flashing. [4]
6.	DR-M-1 2	Prime and coat surface of roof drains having exposed stripping felts with heavy bodied asphalt coating. [6]
7.	MC-M-2 50 LF	Reseal failed joints in metal coping cap and reattach. [7]

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAI | Area: 8547 SF | Age: 16

Total Repair Costs	$	3358	Replacement Cost @ 5.25 SF	$	44872
Additional Service Life		5 Yrs			
Total Repair Cost/ Additional Service Life	$	671.60 $/Yr	Replacement Cost/20 Years	$	2244 $/Yr

Cost Analysis

Generated: Jun/27/2001

$$\text{Ratio} = \frac{\text{Repair Cost/Year}}{\text{Replace Cost/Year}} = 0.30$$

Adjusted Ratio = Ratio + (0.01 * Age) = 0.46

Adjusted Ratio	Recommended Action
0 - 0.8	Repair
0.8 - 1.2	Marginal
> 1.2	Replace

Membrane

DIS-SL-DF	Unit Cost	Qty	Total Cost	DIS-SL-DF	Unit Cost	Qty	Total Cost
BL-H-1	25.37						
BL-M-1	2.08						
DV-H-1	37.48						
DV-M-1	5.69						
DV-M-2	24.06						
DV-M-3	5.69						
EQ-H-1	87.78						
EQ-H-2	156.73						
EQ-M-1	311.06						
EQ-M-2	156.73						
HL-H-1	24.39						
PA-H-1	13.43						
PA-M-1	13.43						
RG-H-1	20.90						
RG-H-2	25.37						
RG-M-1	2.09						
SL-H-1	18.94						
SP-H-1	16.85						
SR-H-1	6.05						
SR-H-2	4.31						
SR-H-3	4.14						
SR-H-4	25.44						
SR-M-1	2.09						
SR-M-2	2.41						
SR-M-3	1.17						
SR-M-4	3.54						

Economic Evaluation Worksheet for a Built-Up Roofing System

Agency/Inst: IPP - Intermountain Power Project | Building/Section: 9BSE-A 9BSEAI | Area: 8547 SF | Age: 16

Flashing

DIS-SL-DF	Unit Cost	Qty	Total Cost
BF-H-1	23.37	4	$ 93.48
BF-H-2	9.97		
BF-H-3	30.69		
BF-M-1	4.72		
BF-M-2	4.78	376	$ 1797.28
BF-M-3	5.88		
BF-M-4	19.03		
DR-H-1	27.51		
DR-H-2	51.45		
DR-H-3	47.43		
DR-H-4	102.21		
DR-M-1	21.98	2	$ 43.96
DR-M-2	34.20		
DR-M-3	19.54		
EM-H-1	6.63		
EM-H-2	8.56		
EM-H-3	14.60		
EM-H-4	7.63		
EM-H-5	21.16		
EM-M-2	6.46		
EM-M-3	6.68		
EM-M-4	6.80		
FP-H-1	16.82		
FP-H-2	47.26		
FP-H-3	82.84		
FP-H-4	22.88		
FP-M-1	4.81		
FP-M-2	5.78		
FP-M-3	31.07		
FP-M-4	19.54		
MC-H-1	9.50		
MC-H-2	9.44		
MC-H-3	5.37		
MC-M-1	15.41		
MC-M-2	18.19	50	$ 909.50
MC-M-3	8.11		
MC-M-4	4.00		
MC-M-5	6.63		
PP-H-1	19.54		
PP-H-2	37.47		
PP-H-3	21.98		
PP-H-4	51.69		

DIS-SL-DF	Unit Cost	Qty	Total Cost

Insulation: 0.00 NONE

Repair SetUp Charge = $ 514

IP12_004057